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Introduction
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PART ONE

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Introduction
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PART ONE

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Cleveland Hospital and
Health Survey

Department of Social Service University of Toronto

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Cleveland, Ohio

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The Cleveland Hospital Council
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Cleveland - Ohio

Preface

The Hospital and Health Survey of Cleveland was made at the request of the Cleveland Hospital Council.

The Survey Committee appointed to be directly responsible for the work and through whose hands this report has been received for publication consisted of the following:

MALCOLM L. MCBRIDE, Chairman
MRS. ALFRED A. BREWSTER
THOMAS COUHLIN
RICHARD F. GRANT
SAMUEL H. HALLE
OTTO MILLER
DR. H. L. ROCKWOOD
HOWELL WRIGHT, Secretary

The staff responsible for the work were:

Director—**HAVEN EMERSON, M. D.**

Assistant-Director—**GERTRUDE E. STURGES, M. D.**

Cleveland Division of Health—

Study in charge of **HAVEN EMERSON, M. D.**

Assisted by
- **W. G. MOOREHOUSE, M. D.**
- **G. B. GASCOIGNE**
- **I. S. OSBORN**

Consultant in Orthopedics—**ROBERT B. OSGOOD, M. D.**

Hospitals and Dispensaries in Cleveland—

Study in charge of **MICHAEL M. DAVIS, JR., PH. D.**

Assisted by
- **ANNA M. RICHARDSON, M. D.**
- **MRS. MARY STRONG BURNS, R. N.**
- **MISS H. L. LEETE, R. N.**

Consultant in Hospital Administration—**W. L. BABCOCK, M. D.**

Consultant in Convalescent Care—**FREDERIC BRUSH, M. D.**

Nursing in Cleveland—

Study in charge of **MISS JOSEPHINE GOLDMARK, B. A.**

Assisted by
- **MISS ANNE STRONG, R. N.**
- **MRS. ALICE F. PIGGOTT, R. N.**
- **MISS ELIZABETH FOX, R. N.**
- **MISS JANET M. GEISTER, R. N.**
- **MISS A. H. TURNER, A. B.**
- **MRS. ANNA STAEBLER, R. N.**

Industry in Cleveland—

Study in charge of **Wade Wright, M. D.**

Assisted by	**Mrs. Marie Wright** **Miss Florence V. Ball**

Venereal Disease in Cleveland—

Study in charge of **W. F. Snow, M. D.**

Assisted by	**Alec Thomson, M. D.** **Allison French** **Mrs. M. P. Falconer** **Bascomb Johnson**

Child Health Work in Cleveland—

Consultant in Child Health—**S. Josephine Baker, M. D., D. P. H.**
In charge of Sanitary Survey of Children's Institutions—
Henry G. MacAdam, M. D.

Tuberculosis in Cleveland—
Study in charge of **Donald B. Armstrong, M. D.**

Mental Hygiene in Cleveland—
Study in charge of **Thomas W. Salmon, M. D.**
Assisted by **Jesse M. W. Scott, M. D.**

Vital Statistics in Cleveland—
Study in charge of **Louis I. Dublin, Ph. D.**

Pharmacy in Cleveland—
Study made by **Edward Spease, B. S.**

The entire staff is under obligation to **Miss Elizabeth R. Cummer** and **Miss Josephine Colegrove** for secretarial work in assembling and preparing reports on individual hospitals, in proof-reading and in indexing the completed report.

Bibliography of Surveys prepared by **Miss Julia T. Emerson.**

Publicity for the Survey in Cleveland—
In charge of **Carlton Matson**
Assisted by **Miss Georgia Bowen**

Special Reports were contributed by—

National Committee for the Prevention of Blindness.
Mrs. Winifred Hathaway, Executive Secretary.

American Society for the Control of Cancer.
F. J. Osborne, Executive Secretary.

Association for the Prevention and Relief of Heart Disease.
Miss M. E. Woughter, Executive Secretary.

The expenses of the Survey and of the publication of the report have been met by appropriations received from the Community Chest through the Welfare Federation, of which the Hospital Council is a member.

The report as a whole or by sections can be obtained from the Cleveland Hospital Council. A list of the parts will be found in the back of this volume, together with prices.

Letters of Transmittal

Letters of Transmittal

To the Cleveland Hospital Council:

There is presented herewith the report of the Committee on the Hospital and Health Survey of Cleveland, appointed on October 1, 1919, as recorded in the minutes of the Cleveland Hospital Council:

"Moved by Mr. Anisfield:

"That the action of the President of the Cleveland Hospital Council in appointing a committee consisting of the following persons: Malcolm L. McBride, Chairman; Otto Miller, Richard Grant, Dr. H. L. Rockwood, Thomas L. Coughlin, Samuel H. Halle and Mrs. A. A. Brewster, to conduct a health survey of the City of Cleveland, be ratified and endorsed, and that the general outline of the Hospital and Health Survey as prepared by Mr. Wright and attached hereto be used as a guide by the committee in conduction of the Survey, which outline shall be subject to modification as may be needed.

"The Committee will have full power in the premises to engage personnel and proceed with the Survey. It is emphasized that there should be specific and definite recommendations regarding the building programs and the character of the future work of the existing hospitals, such recommendations to be made at as early a date as possible.

"Throughout the whole investigation the committee is asked to be as specific as possible in its recommendations.

"Seconded by Mr. Hildreth and carried unanimously."

GENERAL OUTLINE

For Hospital and Health Survey

Hospital and health activities have a common purpose.

It is better public health and fewer preventable deaths. There are four fundamental contributing factors to the efficient work of all hospital and health organizations working to this end.

These are:

Development of medical education, both post graduate and under graduate.

Development of nursing education, both general and special.

Advancement of public health and preventive medicine.

Care of the individual sick.

Due consideration must be given to each of these four factors in considering the work of any individual hospital or health organization or group of such organizations or community hospital or health needs.

The work of this committee may be divided into two parts:

I. A survey and study of the existing hospital and health activities—public or private—of Cleveland. It should determine the contribution which is now being made to the common end by the different institutions individually and collectively, discover ways in which these institutions may be made to contribute more by reasonable changes either in the division of labor with other institutions, the volume of work done or contemplated, or in the way of doing work. This involves a survey and study of:

1. Medical education in Cleveland as at present conducted.
    (a) Use of clinical material and facilities in Cleveland by the Medical School for under-graduate instruction, for post-graduate instruction of young medical men, for instruction and development of the medical profession in general.
2. A study of nursing education as conducted at present in Cleveland.
    (a) Training Schools giving general nursing education.
    (b) Facilities for providing nurses with special education and training.
3. The Division of Health of the City of Cleveland and its relation to the hospitals, dispensaries and other medical institutions and the profession in general. Its activities in the care of contagious diseases and in preventive medicine.
4. A study of the existing hospitals and their plans for extension to determine:
    (a) The available and contemplated facilities for—
        Pay or private room patients,
        Part-pay and ward patients,
        Free patients.
    (b) The probable normal needs of the community for each of these classes of accommodations.
5. A study to determine the present and contemplated facilities as well as the probable normal needs of the city for the care of certain classes of sick:
    Contagious, including venereal diseases,
    Acute surgical,
    Acute medical,
    Chronic surgical and orthopedic,
    Chronic medical,
    Convalescent,
        The immediate development of facilities for chronic and convalescent patients as a means of saving hospital space.
    Insane and mental diseases,
    Aged and infirm,
    Maternity,
    Babies and children,
    Accident and emergency.
6. Dispensaries. A study of their location as to their availability to all Cleveland citizens in need; the type of cases receiving treatment therein; the facilities of the various dispensaries to do properly the work undertaken.

II. The second part is a more extended study of the community to determine the ideal number, grouping, location, character and functions of the hospital, medical and health institutions which can best serve Cleveland at present and during the reasonable future development of the city. This entails the following:

1. Morbidity, accident and mortality rates for the city, as a whole, and by districts, based on city statistics, questionnaires to doctors, hospital and dispensary records, Industrial Commission reports, U. S. Census figures on occupations, races and ages and morbidity census in other cities, perhaps house-to-house canvass of selected districts to learn amount of sickness, total and classified.
2. Care secured by the sick, economic ability to secure care. Home conditions affecting care. Knowledge or ignorance of existing facilities. Efforts of agencies to reach those needing their care. Constituencies of various hospitals or attraction of hospitals for various groups. Survey of adequacy of home care in typical neighborhoods.
3. Capacities and facilities of existing agencies for giving the amount of remedial care shown to be needed by studies of the amount and present care of all sickness, accidents, and by prospective increase of population.
4. The estimated reduction in sickness from extension of preventive medicine and health insurance, based on European experiences.
5. The Medical School's relation to present and future hospitals, dispensaries, sickness prevention and the health department.
6. The relation of nursing training schools to present and future hospitals, dispensaries, sickness prevention and the health department.

On October 3, 1919, arrangements were made to undertake the study as proposed in the communication appointing this committee.

The Survey staff was organized and began its work in Cleveland on November 9, 1919. The field studies, the public meetings and the conferences with representatives of the organizations and agencies, both public and private, concerned with the various aspects of the field of inquiry were completed early in July, 1920.

The accompanying text, now printed and available for distribution, has been passed upon and approved by the committee.

The subjects treated of include those specified at the time the committee was appointed and several others which it seemed desirable to add during the progress of the studies.

It is recommended that the Cleveland Hospital Council use its influence in support of the proposals and conclusions of the report.

Your committee requests its discharge with the completion of the services expected of it.

(Signed) MALCOLM L. MCBRIDE, *Chairman,*
MRS. ALFRED A. BREWSTER,
THOMAS COUGHLIN,
RICHARD F. GRANT,
SAMUEL H. HALLE,
OTTO MILLER,
DR. H. L. ROCKWOOD,
HOWELL WRIGHT, *Secretary.*

Cleveland, Ohio, September, 1920.

TO THE HOSPITAL AND HEALTH SURVEY COMMITTEE
OF THE CLEVELAND HOSPITAL COUNCIL:

SIRS:

There is herewith presented to you in its completed form and prepared for publication the report of the several members of the Survey staff who have, under my direction, and with your approval, studied the Hospital Service, Education in the Medical and Allied Professions, and the Facilities for Health Protection in Cleveland.

At the risk of criticism for failure to seize the opportunities presented to obtain and report all possible facts bearing upon the care of the sick and the protection or development of health, only such material has been collected and only such portions of the collected data have been prepared for publication as appeared to contribute substantial force to the discussion of the problems and to the recommendations arrived at.

Wherever information reliable in source and for all practical purposes comparable to what would be found in Cleveland was known of, it was accepted and used without attempt at duplication or repetition.

From the beginning of our studies all of the investigators and consultants engaged in the work have acted upon the assumption that personal discussion, argument, demonstration and persuasion upon the spot with those directly concerned with administration or service in the health or hospital field, was sure to contribute more to change in method or improvement in results than could be expected from the reading of the printed page at a later date.

There have been no pains spared to insure a broad and intimate contact with all groups of citizens concerned in any way in the multitude of services comprised in the hospital and health problem.

Recognizing that Cleveland has been a generous contributor to each of the national movements now engaged in attacking the causes of ill health and in spreading knowledge of self-protection against disease and disability, it seemed reasonable to expect in return collaboration by these same national groups in Cleveland's effort at self-analysis and a share in the responsibility and privilege for providing a plan and program for so typical and aggressive an American municipality. Either through direct assumption of the entire cost of services obtained, or by sharing the cost of officers temporarily assigned to the Cleveland Survey, or through the generous gift of time and attention at no expense to the Survey, we have been so fortunate as to obtain for incorporation into our report the studies and conclusions of representatives of:

The National Tuberculosis Association,
The American Social Hygiene Association,
The National Committee for Mental Hygiene,
The National Committee for the Control of Cancer,
The Society for the Prevention and Relief of Heart Disease,
The National Committee for the Prevention of Blindness,
The National Committee for Study of Public Health Nursing Education.

The American College of Surgeons.
Our investigators have been drawn also from the
Harvard School of Industrial Hygiene,
Boston Dispensary,
New York City Department of Health,
American Red Cross,
American Child Hygiene Association.

From Cleveland itself we have obtained continuous, helpful and devoted service, not only from those whose occupations, professional and lay, placed them in a position to assist or contribute to the volume and success of our study, but from that great group of well informed men and women who are ready to devote their time and capacities to any undertaking which offers assurance of improvement in the conditions of life of their fellow citizens. Among the most important sources of assistance have been the officers of the Division of Health, the Board of Education, the Welfare Federation, the Academy of Medicine, Western Reserve University, the Central Nursing Committee, the Visiting Nurse Association, the Associated Charities, the Consumers' League, Y. W. C. A., the Junior League and the Women's City Club.

During the course of the Survey there was opportunity to supplement and cooperate with:

(a) A special committee on Social Hygiene whose work was drawing to a close about the time this Survey was begun.

(b) The Welfare Federation, which undertook a study of the social, educational and recreational functions of the institutions for children, while the Survey analyzed the sanitary, medical and health services provided.

(c) The Consumers' League in its study of the use of milk in Cleveland and in its recently inaugurated study of the employment of children.

In submitting this report it is a pleasure to pay tribute to the breadth of vision and the public spirit shown in the objectives which the Cleveland Hospital Council set before you, its committee, for accomplishment. It seems reasonable to expect that such benefits as may accrue to Cleveland from the study of the local situation are not to be confined to this city alone, but will stimulate similar studies elsewhere and will prove of practical value to that large group of executives, trustees and their financial supporters throughout the country, who are carrying the responsibility for health development and its protection, for disease prevention and its treatment, for education in the field of medical services.

For the support, encouragement and critical judgment of the committee I wish to express the gratitude of those engaged upon the Survey. There have been offered to us full freedom of opportunity and a spirit of cooperation and helpfulness without which our friendly contact with the institutions, agencies and branches of the civil government would have been difficult to obtain.

It must be apparent that in no single subject of our report has the field of study been exhausted. Our conclusions may well be modified in the future by what we trust will be undertaken in the way of further self-analysis and research in the methods and results of medical social service which nowadays fills so important and costly a function in the structure of community life, safety and progress.

The cost of the Survey has come within the amount originally set aside for this purpose: namely, $53,000, of which $3,000 had been spent on a study and report of social conditions which contribute to venereal disease incidence before the general plan of the hospital and health study was completed. The total cost of the Survey, estimated at the time of going to press, including publicity service and publication of the report, has been $52,668.98, under the following functional headings:

Direction and Administration	$24,902.38
Tuberculosis	938.63
Hospital and Dispensary	5,117.54
Child Hygiene	1,026.27
Statistical	562.00
Venereal Disease	3,586.04
Nursing	3,829.85
Mental Disease and Mental Deficiency	385.00
Industrial Hygiene	4,429.68
Children's Institutions	891.59
Publication	7,000.00
Total	$52,668.98

In addition to the services paid for under the above headings there have been contributed, as indicated previously, the services of the representatives of a number of the national and local organizations interested in some aspect of health protection. It would have been impracticable to engage and pay for those directing and participating in these contributed services, but the following statement gives a very conservative estimate of the financial burden which has been borne by these organizations in the interest of the Survey of Cleveland:

National Committee on Mental Hygiene	$3,813.52
Committee for Study of Public Health Nursing Education	2,210.00
American Social Hygiene Association	1,500.00
The Welfare Federation, Cleveland	1,400.00
The Consumers' League of Ohio	800.00
American Red Cross Bureau of Public Health Nursing	250.00
American Society for Control of Cancer	100.00
National Society for the Prevention of Blindness	100.00
Association for Prevention and Relief of Heart Disease	100.00
	$10,273.52

Owing to the fact that the work of the Survey has extended over a considerable period of time and since continuous progress in the development of services for the sick and facilities for disease prevention has occurred in Cleveland during the period of our study, it will be found that the present report, consisting as it does of contributions made by investigators at different periods of time between November, 1919, and July, 1920, does not in all respects describe the conditions as they are on the date of publication. Furthermore, it will be a matter of satisfaction to you, as well as a matter of interest to the reader, to know that many of the recommendations which are proposed in the various chapters of our report have already been adopted.

It has been a privilege to be associated with the investigators who have shared the work and to have played the part of coordinator in the undertaking.

Respectfully submitted by

HAVEN EMERSON, M. D., *Director*.

Cleveland, Ohio,
Hospital and Health Survey,
September 22, 1920.

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Hospital and Health Survey of Cleveland, Ohio

A Report Presented to the Committee on Survey of the Cleveland Hospital Council

By

HAVEN EMERSON, M. D., *Director*,
and the following collaborators:

GERTRUDE E. STURGES, M. D., *Assistant Director;*

MICHAEL M. DAVIS, JR., Ph. D., *Director of the Hospital and Dispensary Survey;*

JOSEPHINE GOLDMARK, A. M., *Director of the Nursing Survey;*

WADE WRIGHT, M. D., *Director of the Industrial Hygiene Survey;*

S. JOSEPHINE BAKER, M. D., D. P. H., *Director of the Infant and Maternity Survey;*

T. W. SALMON, M. D., *Director of the Mental Hygiene Survey;*

W. F. SNOW, M. D., *Director of the Venereal Disease Survey;*

LOUIS I. DUBLIN, Ph. D., *Director of the Vital Statistics Survey.*

Introduction

By Haven Emerson, M. D.

> "A few great points steadily reappear, alike in the poverty of the obscurest farm and in the miscellany of metropolitan life. * * * * . These few are alone to be regarded: the escape from all false ties; courage to be what we are; and love of what is simple and beautiful; independence, and cheerful relations, these are the essentials—these and the wish to serve—to add somewhat to the well-being of men."

THE habit of mind or of work which prevails in the United States is rather to move from the practical to the theoretical than in the reverse order. As is natural in a young nation free from the established procedures and precedents of government and personal conduct which dominate the life of older countries, we see a need, we move to meet it, we presently suspect our method or results might be improved, we collect records, study, evolve a theory and perhaps then begin to apply the principles evolved to new undertakings in the same direction. We have not evolved a theory and principles of health development, of health protection, of disease prevention, of death postponement. It has been one of the illuminating educational features of our contact with the keenly analytical, the intellectually honest minds of our French colleagues during the war that we have met a system of education and practice which begins with theory and principle, and gradually through individual and ultimately through government action arrives at application of theory to practical needs.

This report is a contribution to the study of current facts, accomplishments, undertakings in the field of medico-social service. Theory is not within the plan of this presentation, but it is hoped that by the study of facts, by the application of recommendations, theory may be tested and the philosophy of social organization for the attainment of health and its maintenance may be advanced.

Those of us who have shared in this study are perforce enthusiasts, if you will, fanatics, crusaders in what we believe is to prove the greatest contribution of this generation to the success of a representative and democratic social order: namely, civil and social organization for health. Neither forms of government nor systems of society will long endure unless the health, mental and physical, of the people is accepted as a matter of official and individual concern, in importance second only to the administration of justice, provision of education, liberty of speech and of religious observance.

This is not the place to press the argument. Personal experience and government documents in abundance provide the data from which students will decide the amount and distribution of wastage from sickness and premature death. No expression, in terms of money equivalent of human labor, of this burden upon life, this deficit in happiness, adequately represents the true total, but even to the so-called practical man, that much abused man-in-the-street who is supposed to be merely a mechanical adding machine without sympathies, emotions or imagination, the figures are impressive.

Expressed for the population of Cleveland and its suburbs, roughly a population of 1,000,000 within Cuyahoga County in 1920, and using the death and sick rates experience of 70 per cent of the total population of continental United States in 1916, and the sickness census in various cities, such as Pittsburgh, Boston and Rochester in recent years as applicable to the experience in Cleveland in 1920, we must picture about two per cent of all the people all the time too sick to work or be up and about, from causes of which one-half are certainly preventable.

In 1919 the cost of illness and death from communicable diseases alone in Cleveland, based on the very conservative estimates of value of life and cost of sickness, burial, etc., used in a study in Illinois* must have been not less than $25,000,000. To this must be added, among other items, the cost of death and disease due to preventable but non-communicable forms of disease and the cost of $200 a year for each insane person and $160 a year for each feeble-minded person cared for in institutions.

Further, we must recognize that not less than 35 per cent, and in some places as much as 75 per cent, of dependency seeking relief from public or private sources, is due to sickness. To say that dependency is in large measure due to sickness is merely the corollary of the statement that the average of independence is everywhere lowered by sickness, and upon independence our whole social, family and labor structure is based.

Three services we shall always need if we intend to provide the best that science affords to heal the sick and to guard the well against disease. Each service although indispensable by and for itself is, however, necessarily dependent upon the other two for its complete usefulness and application, and no one can be omitted without sacrifice of much of the value of the others.

Diagnosis and Treatment of the sick comes first to mind as it was first to be provided, but first by a narrow margin of time before the Teaching of Medicine. These two led by many ages the third, the Prevention of Disease.

We have won our way from an attitude of passive submission or acceptance of disease and disability as inflictions of fate, of some evil genius, or by the gods or our own Divinity, through the self-respecting and upright position of self-defense against disease, using the weapons of science, until we are now moving aggressively forward attacking disease and determined to overcome it by all the resources of society as well as of science, by instilling into people the hope, the promise, the certainty of health, as well as by assembling, coordinating, directing with our knowledge of preventive medicine and organized government a continuous warfare upon all the physical, biological, economic and spiritual handicaps against which man and child cannot successfully make progress alone.

First, and first by a long interval among the weapons of attack, comes education, not alone the training of the intelligence, the distribution of facts, but the development of the feelings, the emotions, the instinctive reactions which guide us chiefly in the emergencies and great decisions of life. The channels of this education are not alone the schools and colleges but the individual field workers, the physicians, the nurses, the public health officers, the social workers, the school teachers who make contact with the homes. Health, its attainment, its defense, its prolongation, cannot be taught all

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*Hemenway, *American Journal of Public Health* Vol. 10, Number 2, February, 1920.

the time to all the people, and to but few and for but short periods, through the public press or the distribution of so-called "literature" and propaganda by pictures, posters, etc.

Rarely there comes the great teacher, one who compels attention by his knowledge or his art, a Franklin, a Pasteur, an Osler, but, in the main, health teaching, except to the few training for certain professions, will be given effectively only to those who are for one reason or another teachable. Children are teachable because youth is acquisitive and interested in itself and all that concerns its body and its playmates. Mothers are teachable for the sake of their babies. Perhaps one may include both parents sometimes in this class, while their children are still dependent. The sick and suffering are generally teachable from self-interest, from hope, from humility. In the presence of epidemic disease of the kinds such as influenza and infantile paralysis, against which we have no reliable measures of defense, everyone can be taught the elements of personal hygiene and good health habits because of the fear of death.

The first three groups include all the community at some periods of their lives and we owe them guarantee that the physicians, nurses, teachers and others whom they are beholden to at these periods for care and instruction, themselves know what must be taught and furthermore practise what they preach.

In this guarantee we fail at present. What can be done to protect those who are uninstructed must be done *for* people rather than *by* them, and here we come upon the functions of the public and private agencies for disease prevention. In this field we are emerging from the era when the health officer was a lawyer, a policeman, a scavenger, a mere clerk, to the conception of the health officer as a leader in social organization, a student of disease as it occurs in groups, an administrator of services which make life more secure and happier in every household, in reality the family physician of the community, its trusted advisor and protector.

For those whom our education and our devices for prevention have been of no avail, the sick and injured of medical practice, the wastage resulting from our ineffectiveness in protection, we provide the physician, the visiting nurse, the dispensary, the hospital, the convalescent care. That there should be so much more needed to pay the cost of repair work than is thought sufficient to spend for prevention is a commentary upon our intelligence, a sharp reminder of our wastefulness, of our undeveloped business acumen.

In the chapters which follow there will be given a description of the services provided in Cleveland for the prevention of disease and for the care of the sick, including description of the facilities for training those who contribute to this care. Where there are defects they will be pointed out, with, where possible, specific recommendations for their remedy. So a diagnosis and treatment for the city will be developed in a way similar to the method used in the physician's office or hospital.

We were invited to Cleveland to learn and to state the facts and if more emphasis appears to be put upon shortcomings than upon excellencies it is not because the latter were not observed and admired, but that extensive comment upon the bright eyes and rosy cheeks of the patient seems malapropos when there is a dressing to do for a broken arm.

For convenience in distribution of the report to students and workers in the various special fields of hospital and health work the text is divided into eleven parts.

Under General Environment and Sanitation, Part I, will be found description of those elementary factors upon which are based an estimate of the standards of living attained by a community. The reader will wish to know the area and population, something of the geology and the nationalities, and what the history of growth predicts for future needs. As life and the success or failure we make of it is largely a matter of our ability to adapt ourselves to natural and artificial variations in environment, we are interested in Nature's allotment of weather to this man-picked site for a great human aggregation. What man does to his fellow-men is certain to be more of a menace than what the elements dispense, and his home, where his children are reared, where he and his wife and the little ones spend the major part of their time, is found here as it is elsewhere in our cities commonly far below the limit either of our means or of our knowledge or of our legal requirements for healthy living.

The blessing of pure water is within his reach, and in the main there is good provision for disposal of his wastes, for man, like bacteria, cannot live long in the midst of his own offal and dirt.

With his air the Clevelander is not so fastidious and, although it is supposed to be the only remaining necessity of life still free for the humblest citizen, yet we find a filthiness of air which robs the child of its breath, the sun of its strength, the sky of its precious color, and simply because of habit and unneighborliness, the habit of ignoring coal smoke as a public nuisance and indifference to the inconvenience caused to the other fellow by your own belching chimney.

In Part II. we deal with the dual machinery of public and private organization for health protection. After outlining the basis in law and in local government administration for the powers and services of various departments which contribute to health in Cleveland, the Division of Health and its bureaus are described and analyzed. The parsimony of public appropriating bodies in matters of insurance against disease and death through investment in the services of doctors and nurses is in striking contrast with the liberal use of tax money to protect property against violence and fire. There are defects in personnel, organization and inadequacy of resources, but that there is a record of important and encouraging accomplishment cannot be doubted.

Without a service for public education for legitimate civic advertising of needs and opportunities in health protection any health service is sadly crippled. This is the case in Cleveland.

Official protection of industrial workers against health hazards is needed and would be welcomed, but it is not offered in the present health service.

The children of the parochial schools, the children of pre-school age, the expectant mother, all lack the life saving service which is offered at public expense in some other cities.

As the family physician of the city the Commissioner of Health should be provided with physicians to maintain supervision over the health of those children whose lives are spent in the unnatural environment of institutions. This he cannot do at present.

Among the existing bureaus there is none needing such a radical overhauling as the Bureau of Vital Statistics. An adequate record of human liabilities and assets is indispensable to intelligent public health work. A conception is presented of the possibilities, the necessities, the advantages of a true demographic office and reports for the city, a model for a municipality, an example which if followed would elevate the city, the state and the nation in the estimation of thoughtful people here and abroad.

One of the archaisms of our civil government is disclosed in the persistence of the coroner's system. Until Cleveland follows the example of Boston and New York in establishing this function under non-political, competent pathologists there will be inefficiency, graft and the cloaking of crime under the forms and appearance of law.

Everywhere we find private energy and sympathy organized to supplement public service. This is particularly the case in preventive and relief work for the sick. The crippled, the blind, the lame in heart and mind always will be sought out and assisted to such happiness and occupation as they can attain. Sooner or later the wish to prevent rises into effective effort and real health protection develops. There are in Cleveland as elsewhere special agencies for the care of the many handicapped, and the special merit of Cleveland is in the successful coordination of support and direction of many of these medical and social services maintained by private resources. These are described in some detail in the chapter on Private Health Services and the total of undertakings is certainly impressive, in spite of the gaps, which it is hoped will soon be filled.

Although the subject matter of Part III. deals with many important functions and accomplishments of the Division of Health, and as well includes description and discussion of auxiliary private agencies, the leading role of the child's health as the objective of the great majority of private and public health services made it seem wise to set apart this program in its entirety from the general field covered in Part II. Probably in no subject of public health work will the results of a logical and thorough integration of the public and private agencies bring such economies in cost and personnel and such large returns. A good beginning has been made in prenatal care of expectant mothers; a start upon service for the children between two and six years, the pre-school child, is assured; important improvements in public protection of the child in industry are under way. In the public schools, and more particularly in the parochial schools, there is need of thorough medical examination and home follow-up by nurses.

Except for the defects of development, nutrition and exposures to infection which result from the child's handicaps of home environment, the most serious defect in the provision made by the public for children during the years of compulsory school attendance is the quality of air permitted in the school rooms. In the majority of school rooms and in all those in the newer school buildings the systems of so-called mechanical ventilation are in control of the child's vitality. Laws, more in the interest of building contractors and engineers than of children's health, impose a plan of so-called ventilation which is really a kind of slow strangulation process. The open window has been shut by law. Children's health requires open window ventilation all the year round. The laws must be changed and school management be so arranged that the air in class rooms may be freely flowing, cool and fresh, with as nearly as practicable the relative humidity of outdoor air.

Tuberculosis in Cleveland, which is dealt with in Part IV., is, first of all, a study of incidence and distribution, necessarily incomplete because of the inadequacy of the records of population, deaths and sickness, but sufficient to show the unfinished work, the need of renewed attack and the ways which have proved helpful elsewhere. In this subject, as in the following one of Venereal Diseases, we are face to face with a problem of social contacts. No mere medical knowledge, no public or private health organizations alone will accomplish the reduction or control of the spread of tuberculosis. As man's own habits, his customs, his environment artificially created, are the multitudinous contributory factors both to infection and to active expression of the disease, so it must be through a spread of knowledge, through intelligent, clean living, through the abatement of injustices which tax the nourishment, the rest, the peace of mind of those of modest means that we must look for diminution of tuberculosis, as well as through the greater skill of physicians in the early detection and in the arrest of active tuberculous disease.

While tuberculosis remains the cause of something over 12 per cent of all deaths and responsible for the most costly of all sicknesses, and while we do not know the fact of sickness before death in at least 30 per cent of all persons dying of tuberculosis, there needs no elaborate exposition of our social and official shortcomings. The report upon the exact conditions in Cleveland will certainly lead to a stronger determination and a more generous support for medical and social agencies engaged on this problem.

The so-called American Plan for the control of venereal disease is used in Part V. to measure Cleveland's accomplishment. From being a subject of technical discussion among specialists at medical society meetings the problem of control of syphilis and gonorrhea has aroused open discussion on the floor of Congress, has enlisted the joint action of three of the most powerful departments of the Federal Government, is accorded earnest consideration and intelligent discussion in state legislatures and has been raised from shame and silence into the range of decent educational publicity.

It is not for physicians, nurses, hospital superintendents and health officers that this subject is here dealt with. The origins of syphilis and gonorrhea are so intricately beset with social factors that although the scientific facts of etiology and diagnosis, the course of the diseases and their treatment have given the courage of knowledge in our campaigns, still by education in character, self-restraint, control of the brute in us by our better natures and by sparing our children the unfavorable contributory factors in employment, conduct, recreation and opportunity which have generally prevailed until now, we can do as much through social organization as through health services. As the text of the chapters will show there is ample opportunity for advance along lines to suit the inclinations of the lay worker, as well as the practitioner or student in laboratory research.

Part VI. gives a picture which will develop humility in thinking people. With our vaunted humanity and practical efficiency we prove ourselves inhuman in our collection and treatment of the most pitiful of human wreckage and inefficient in our indifference to the debt of feeble-mindedness and insanity we are permitting to be piled up for the next generation, by failure to provide for segregation and institutional care for the thousands now at large in the homes of the city.

No more scathing comment upon civil administration could be made than the description of the kind of care provided for the mentally afflicted at City Hospital. Could this have occurred if there had been an active, alert, interested group of physicians and others organized to help the problems of mental hygiene, the interests of the mentally lame, the opportunities for prevention and education in Cleveland? Probably not, and certainly one of the results of the present brilliant statement of the situation should be the establishment of a local mental hygiene committee affiliated with the national body of this name.

Part VII., the volume on the Medical Services in Industry, Women and Industry, and Children and Industry, represents the first effort in this country or, so far as we are aware, elsewhere, to see the broad landscape of this new professional country. Where are the workers? How distributed in large and small plants? What the quantity and quality of the professional care provided for them? What is to be expected from reasonable care of the workers in terms of production and of producers? Such are questions that await answers. To quote from the first chapter of the report, "Cleveland is an industrial community; the greatest common interest of her people is her industries, and those of her people who labor therein are the life of the city. The future of Cleveland depends upon the well-being and the happiness of her industrial workers and to secure and safeguard their health is the vital task of industrial medical service."

Such services are understood by the few leaders and the methods and results are matters of record for those who wish to learn. The city awaits and needs the advantages of these services, the results of which can be guaranteed.

That there should be more than twenty-two thousand women occupied in industry may seem a small quota to take from the home makers of a city of 800,000 people, but as a unit exposed to varied and serious risks, as a great army of possible or prospective or present mothers, the interest of the state in their safety and continued health is large. That there are special physical disabilities acquired by women in apparently safe and reasonable work is well known. That fatigue plays a more serious part in the damage to women's health than is generally found among men, or at least expresses itself in a variety of troublesome nervous affections, is seen in some industries. That women should be excluded from night work is perhaps too obvious to argue. Now with the facts before us, it is safe to say that with the increasing power of women in organization and self-determination it will not be long before remedies are found for the worst evils. The women of Ohio certainly need the rights of suffrage.

How loosely we count our treasures, how careless we are of the strength of our men and women in the making, is told in the story of children in industry. Not a lurid tale of child slavery but an inventory of the pros and cons of this undesirable element in national wealth. The strengthening of laws will accomplish something, their better enforcement still more, but the final answer to the question of children in industry will be given only when parents see that in education and vocational training there is a greater return in maturity than the early earnings of children can provide.

In Parts VIII. and IX. the profession of medicine and its associates, in service to the sick are dealt with, the training provided for them and the relations of their licensed practitioners to preventive and curative medicine. This involves a consideration of the University which mothers them all, her limitations, and wherein her children suffer from lack of educational pabulum. Much is asked of the University in the way of new undertakings in the educational field, all depending on the sinews of war—the state of the University treasury. Much is expected, however, by the injection of a more active leadership and initiative among trustees and teachers. The governing and teaching bodies need a generous dose of democracy and a sense of personal responsibility for a closer touch with the needs of the community. The visions of a great installation will all in time come true, but even without fine structures, conditions can be provided which will attract and hold that quality of brains upon which alone great schools are built.

In the practice of medicine certain characteristics are apparent which pertain more to the era of small town existence than to the service of physicians in a modern metropolis. Lack of use and consideration for the specialties in medicine and surgery are striking to those familiar with practice farther east in the United States, and in European cities. Entertainment as well as cause for serious action will be found in the study of those harpies who fatten on the credulity and ignorance of our foreign tongue immigrants, the irresponsible and illegal practitioner, the advertising quacks.

Dentistry and Pharmacy each present professional problems of importance which cannot be ignored without loss of some measure of help to the public in the care of the sick. Their contributions to preventive medicine also are considerable and increasing in value.

So extensive has the field of nursing become, so dependent are we in all directions of medical and public health practice upon this army of the trained sisterhood, that a study of their profession by a rarely well equipped group of their own graduates and leaders is particularly appropriate and most fortunate for this Survey. Nothing comparable to this has been done for the nursing profession before, and although studies of national extent are under way, Cleveland will now be in a particularly favorable condition to make good its present lead in strategic features of nursing education and practice, while waiting for the report of the National Committee from which we borrowed the director and several of the workers for our own study.

Nurses training in the past and often still presenting a rather sorry picture of mingled exploitation of willing labor and amateurish teaching, is worthily described. Practical means are proposed to meet the obligations of hospitals to both patients and nurse pupils.

Public Health Nursing includes thorough discussion of the services rendered in the many public and private organizations engaged in educational and bedside work through field nurses.

Private nursing, too, though not a matter of chief importance from the point of view of the Survey has had an illuminating brief study put upon it.

It was in the minds of the Trustees of the Cleveland Hospital Council that the conception of this Survey originated, and it was their declaration that the hospital is really a public service institution, responsible alike for prevention and for care of disease, that became the keynote of our program. Since prevention is the spirit of modern medicine the machinery for its accomplishment has had precedence in the order of chapters over the description of those services which have always been primarily devoted to cure, relief or postponement of death amongst the seriously ill.

In Part X. will be found not only a recital of the physical and professional resources of the community in the shape of hospitals, dispensaries and their accessory services beyond their walls, but the spirit, the philosophy, the ideals which imbue the present-day executives of these centers of skill, tenderness and teaching. From cellar to garret the investigators have searched for the good and the poor in hospital management. From the admitting desk, or rather from the doorstep, of the hospital where the disappointed applicant is declined admission, to the report of complete convalescence by the patient at the dispensary or to the social service worker weeks and months later, the path of the patient has been followed and the quality of attention accorded him has been scrutinized

While estimates of the hospital needs of a community will vary with the education of people in the possibilities and advantages of hospital care for their own particular variety or for all varieties of ills, there is yet a basis of experience, a pragmatic test of adequacy to be offered. By this test Cleveland's shortage of beds is manifest. The remedy is, in the first place, adequate buildings and personnel and disinterested administration of its great City Hospital, now a travesty upon hospital service.

Private endowments and initiative will, as far as one can see into the future, always be required and generously supplied to meet the call for hospital beds, and as soon as the present apparent extravagance in cost of construction subsides there will certainly be undertaken great new hospital buildings and expansions of the present admirable ones, all justly held in affectionate regard by a grateful public. The shortage of dispensary service in Cleveland, as compared with service in other leading cities, constitutes another limitation of medical care for a considerable proportion of the population and for the facilities for consultation and diagnosis available to the medical profession.

If one need beyond that of more beds for acute general hospital patients is to be mentioned, it must be the lack of convalescent facilities. This is a typical shortcoming of American cities the meeting of which will go far to abate many of the present troubles of hospital administrators and the professional staffs, and at the same time complete the now unfinished work so well begun in the hospitals themselves.

There is no part of the present report which is so certain to appeal to a broad public as this section on Hospitals and Dispensaries. The public that is served, the public that contributes for the support of hospitals, the responsible trustees and their representatives, the hospital superintendents, the professions (medical, nursing, dental, pharmacy) in the field of education and service, the health officers and the private health agencies, all have an interest in the results of this study and the recommendations presented.

Although individual reports to the trustees of the several hospitals have already been presented to them, the general hospital situation as described will add to the understanding of each in the solution of their separate and particular problems.

What follows is for the convenience of students of sociology, a sketch of methods used, a list of analyses of kindred subjects made by other surveyors, and the inevitable index of subjects to save the reader's time.

Part XI. contains what may be likened to the description of technic in a physician's approach to his patient, the items to be included in his history and physical examination, etc. Although lists of publications dealing with surveys have been issued by libraries it has seemed wise to include here such as have been found useful to our present purpose or have in one way or another been levied upon for information or comparison.

Summary of Recommendations

THE Cleveland Hospital Council specifically requested that detailed and definite recommendations for action be prepared by those responsible for the Survey. In the course of the following chapters the discovery of facts and the discussion of policies have been directed towards as definite a solution for each difficulty or inadequacy as was found practicable. At the end of each chapter there has been placed a summary of recommendations, subject by subject. The full extent of the program which is conceived and the bearing that such a program of medical and social endeavor has upon the fabric of government and upon organized private effort can best be seen by an assembly of the various recommendations in certain main groups. Analysis of those presented in the text shows that they fall logically under four headings.

The first group deals with laws, both state and local (that is, as passed by the state legislature and affecting Cleveland, either directly or through charter provisions, and ordinances enacted by the legislative body of the city —the City Council). The variety of changes thought desirable to suggest is such that it is believed nothing short of an organized effort in the interest of this supplementary program of social legislation will suffice to obtain consideration by the state and local law makers. It is, therefore, recommended that the Welfare Federation request the volunteer services of a committee of lawyers and public officers of the State Legislature and the City Council to consider and act upon the recommendations of the Survey dealing with amendments or additions to the laws.

A study of the recommendations under the various chapters shows that suggestions are made which affect the State Child Labor Law, the State School Code and the local city ordinance dealing with street trades, in the interest of the health of children; the Civil Code and Medical Practice Act in dealing with irresponsible and unlicensed medical and dental practitioners, the annual registry of dentists, the licensing of dental hygienists and nurse attendants and of various state statutes dealing with the sale of drugs elsewhere than in drug stores and the privilege of purchasing tax-free alcohol by retail druggists; the Injunction and Abatement Law, the laws dealing with prostitutes in the interest of control of venereal diseases; the laws covering the diagnosis and treatment of mentally defective persons who come in contact with the courts and the laws dealing with the licensing and supervision of hotels, both of which affect in some measure the social program for venereal disease control; a law providing for supervision and licensing of hospitals under the State Department of Health; the modification of the city charter to permit of the appointment of a Board of Trustees to be responsible for the administration of the City Hospital; the enactment of a revised Sanitary Code for the city of Cleveland.

The second and very extensive group of recommendations deals with the manner of conduct of existing departments of state and city goverment and with the additional activities which it is thought suitable or necessary for them to undertake. Many of the recommendations presented have been discussed in detail with the administrative officers, particularly of the city government, and in some instances with those of state departments within whose power it is to modify procedure or activities to meet the suggestions made. Many of the recommendations cannot, however, be carried out without generous increase of appropriations and some must wait for authority from elected executive officers by whom the administrators are appointed and from whom they have received their authority.

It may be said in general that there is ample authority but insufficient appropriation and personnel to carry out the wishes which the voters and legislators evidently had in mind in framing the laws. The recommendations, as they affect the state government, propose an adequate inspection service to protect the licensed practitioners of the various medical and associated professions; adequate inspection service for the institutions of the state hospitals, institutions for children and others; adequate inspection service to protect women and children in industry and to enforce the child labor law; and the transfer of the responsibility for supervision of food handlers in restaurants from the Department of the State Fire Marshal to the State Department of Health.

General recommendations dealing with the city government include approval of the activities of the City Plan Commission; the investigation of sewage collection, treatment and disposal; investigation of the methods of collection and disposal of rubbish and garbage; a suggestion that the sum of $1,000,000 be provided annually for the next fifteen years for sewer construction. The departments of the city government which the recommendations particularly affect are the Department of Public Welfare, the Board of Education, the Department of Public Service and the Department of Public Safety, under all of which departments there are activities which deal more or less intimately with some or all phases of health protection and care of the sick. It is believed that the most effective way of obtaining improvements of service or extensions of service as suggested in the recommendations bearing upon the departments of city government will be by organizing a Public Health Association in the city of Cleveland, as proposed in the Introductory Chapter of Part II., and it is particularly suggested that one of the most important activities of such an association would be to maintain friendly and cooperative contact with the officers of the city government so that they may feel the support of the citizens, may get the benefit of critical comment upon their activities and will be stimulated to their very best effort by the knowledge that their activities are being analyzed and tested by high standards. By those means of education properly included in the terms propaganda and publicity such an association would materially aid the officers of public departments to obtain adequate funds from the appropriating body, the Board of Control, needed to carry on the activities recommended and desired by the tax-payers. The extent and detail of the recommendations are too great to lend themselves to any summary in this place and the reader is referred to the summaries of recommendations, especially at the ends of chapters dealing with public health services, child welfare, venereal diseases, tuberculosis and mental hygiene.

The third group of recommendations deals with the private agencies. In almost all instances the recommendations as printed in the report have been discussed with the officers or governing bodies of the private agencies which contribute to health protection and the care of the sick. In the case of all the hospitals, in addition to the recommendations here included, a special report, with detailed treatment of all the aspects of hospital work, has been prepared and submitted to the trustees of each of the hospitals in conference and by written statement. In the same way those matters bearing upon educational policies and practices in the various professional schools for medicine and the associated professions in Western Reserve University have been presented by word of mouth and in written report to the University authorities.

The several coordinating agencies, such as the Welfare Federation, the Cleveland Hospital Council, the Academy of Medicine, the Association for the Crippled and Disabled, the Central Nursing Committee, the Kindergarten and Day Nursery Association, have special responsibilities in furthering the recommendations which deal with their component organizations or personnel. Similarly, the Chamber of Commerce, the Rotary Club and the Cleveland Advertising Club have very broad duties in support of all the movements which contribute to the well-being of the public. To these coordinating agencies, both those dealing with professional fields and those of a general business nature, are assigned certain obligations in the recommendations as presented.

Upon industry a considerable burden is placed in suggestions that it meet the modern conception of responsibility to the employes by organizing for their protection against industrial hazards, and for their medical care, the professional and community resources which are mentioned in considerable detail in the section on industry in Cleveland. In addition to certain recommendations which deal with the activities of the Anti-Tuberculosis League the recommendation is made that a number of new and coordinated public health agencies, based on private initiative and support, should be established.

Under the fourth heading would fall naturally the recommendations for new activities. Among these the most important is the Cleveland Public Health Association above referred to, planned as a parent and centralizing force in all private health activities for the city, with section activities to deal with child welfare and its subdivisions — prenatal, pre-school, school child and child labor features—venereal diseases, tuberculosis, cripples, obstetrical care, and so forth. Two of the fields of preventive medicine are not as yet occupied by any private effort in Cleveland; the first, the field of prevention and relief of heart disease, and the second the prevention and cure of cancer. Both the education and the technical professional sides of these two problems need the same kind of organized support that has been provided to develop public services in the fields of tuberculosis, venereal disease and child hygiene.

Two new institutional activities for which the sick of Cleveland are now really suffering are: a well organized central dispensary and provision for convalescent care outside of the general hospitals and under suitable conditions of space and occupation.

In offering such a series of comprehensive suggestions it is recognized that no community however willing, however wealthy, however well educated in its social responsibilities could put into effect all the proposals, without a sacrifice of much that is good in the existing agencies and institutions, which must be used to build upon, and not be destroyed in the process of reconstruction. That all the recommendations can be made, even at the very considerable expense which this will involve, is the confident belief of the staff of the Survey, based upon its contact and experience with the citizens of Cleveland in all walks of life who have been a continuous source of encouragement and inspiration to the investigators throughout the past year. When the program here presented has been carried out it will be found that, in terms of human lives and happiness, Cleveland has greatly increased vital assets although its financial liabilities may be found to have been increased beyond the point to which communities are now accustomed to spend the money of either the tax-payer or the private contributor.

General Environment and Sanitation

Population and Area

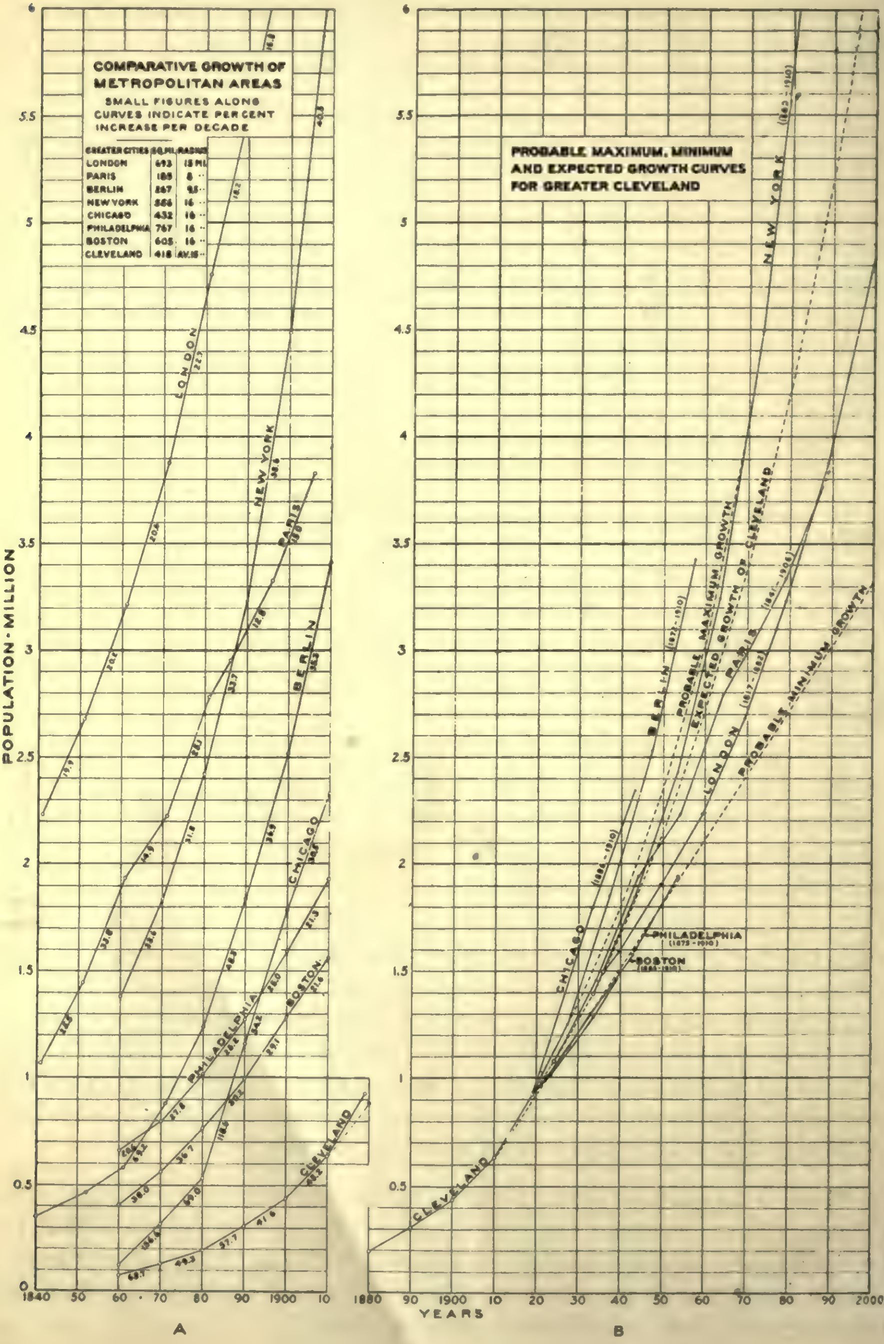
CLEVELAND, founded in 1796, incorporated as a village in 1815, and chartered as a city in 1836, is the largest city of Ohio and the fifth in size in the United States, its population in January, 1920, being 796,836. New York, Philadelphia, Chicago and Detroit are larger. With 1,075 people in 1830, Cleveland grew steadily but slowly until 1872, when, from a population of 100,000, it began a more rapid development. The city and its immediate suburbs have very close to 1,000,000 population now. The favorable commercial and economic conditions existing in Cleveland, together with its advantageous geographical location, combined with its past consistent record for steady growth, warrant the belief that within the next 20 to 25 years a population of one and a half or two million people may be expected.

The characteristic of steady growth in Cleveland is probably due largely to the diversity of business and manufacturing enterprises of the city and their relative stability. The fact that the city is favorably situated on both water and rail routes of national importance with short haul on raw materials and that it is also centrally located for direct distribution of manufactured products to all parts of the country, has undoubtedly been the basis of this steadiness of growth.

There is a very marked separation of the residential districts into groups, the separation being caused primarily by the Cuyahoga River and the valleys and hills typical of the area covered by the city, and, secondarily, by the grouping of population around or near the factories which are located principally along the steam railway lines.

A vigourous, educated, ambitious type of early settlers gave a distinctive character to Cleveland's early existence, and the junction of coal and iron with a favorable harbor and excellent rail and water transport, combined with a rich farming country and fortunate climate, have brought to Cleveland the industrious immigrant and the laborer from our Southern states until it now represents as typical an American city as can be found, with the excellencies and shortcomings in government, living standards and accomplishments which alternately make us proud and mortified.

There is no good reason to believe that the age and race composition of Cleveland have been materially modified in the past ten years unless it be by the addition of large numbers of Negroes. This has been a folk movement and no important preponderance of males has been observed, the families following soon after the arrival of the wage earner.


COMPARATIVE GROWTH OF METROPOLITAN AREAS
SMALL FIGURES ALONG CURVES INDICATE PER CENT INCREASE PER DECADE
GREATER CITIES SQ.MI. RADIUS
LONDON 693 15 MI.
PARIS 185 8 ..
BERLIN 267 9.5 ..
NEW YORK 356 16 ..
CHICAGO 432 16 ..
PHILADELPHIA 767 16 ..
BOSTON 605 16 ..
CLEVELAND 418 AV.15 ..
POPULATION - MILLION
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
1840
50
60
70
80
90
1900
10
LONDON
NEW YORK
PARIS
BERLIN
CHICAGO
PHILADELPHIA
BOSTON
CLEVELAND
A
PROBABLE MAXIMUM, MINIMUM AND EXPECTED GROWTH CURVES FOR GREATER CLEVELAND
1880
90
1900
10
20
30
40
50
60
70
80
90
2000
YEARS
CLEVELAND
CHICAGO (1885-1910)
BERLIN (1875-1910)
PROBABLE MAXIMUM GROWTH
EXPECTED GROWTH OF CLEVELAND
PARIS (1817-1882)
LONDON (1841-1906)
NEW YORK (1863-1910)
PROBABLE MINIMUM GROWTH
PHILADELPHIA (1875-1910)
BOSTON (1885-1910)
B

The 1910 census report shows the following age and race distribution for Cleveland and for the total urban population of the Registration Area of the United States.

	All Classes		Native White				Foreign-Born White		Negro	
			Native Parentage		Foreign or Mixed Parentage					
Ages	Cleveland	U. S. Urban	Cleveland	U. S. Urban	Cleveland	U. S. Urban	Cleveland	U. S. Urban	Cleveland	U. S. Urban
All	100%	100%	23.6%	41.6%	39.9%	28.9%	34.9%	22.6%	1.5%	6.3%
Under 5	11.1	9.8	3.3	4.7	7.4	4.3	.29	.2	.09	.5
5—14	17.4	17.3	4.8	8.2	10.3	6.9	2.0	.1	.16	1.1
15—24	20.5	20.0	4.75	8.6	9.2	6.3	6.2	3.9	.28	1.4
25—44	34.4	33.2	7.3	12.5	9.9	8.0	16.5	10.2	7	2.3
45—64	13.4	15.2	2.6	5.8	2.8	3.1	7.7	5.4	.2	.8
65 and over	3.0	4.0	.6	1.8	.2	.3	2.0	1.7	03	.2

For original nationality of Cleveland residents and further details of population, for the city as a whole and by districts, the reader is referred to the forthcoming data of the 1920 census, which should be published soon after the publication of this report. Re-publishing here the facts of the 1910 census seems superfluous.

Neither the Negro nor the Irish are present in Cleveland in sufficient numbers to materially affect their particular racial susceptibility to pulmonary tuberculosis and other diseases of the respiratory tract, or the morbidity or mortality of the city.

The following, compiled from the best information obtainable of the population and area of this district for the period from 1900 to 1918, inclusive, was made up before the 1920 census figures were available and indicates an overestimation of population:

POPULATION OF CLEVELAND AND SUBURBS

	City Within Corporate Limits	Population per Acre	City and Suburbs	Population per Acre
1900	381,800	17.5	421,834	5.5
1905	459,500	17.4	514,205	6.7
1910	559,900	19.0	630,577	8.2
1915	734,000	21.8	836,089	10.9
1918	855,000	22.8	971,380	12.7

The population per acre in the above table in the case of corporate Cleveland is based upon the area within the corporate limits as of each date, being 34 square miles in 1900 and 58.70 square miles in 1918. The population per acre for the city and suburbs in the right-hand column of the same table is calculated upon the basis of 119.1 square miles as the area occupied by the 971,380 estimated population of 1918.

Politically, the city is divided into 26 wards and 488 precincts, but since there are no continuous or reliable vital statistics available (*i. e.*, births, deaths or sickness) by these subdivisions, the only subdivisions which will be used in this report will be the eight health districts as established in 1917, for which much useful information has been recorded. It is thought to be a matter of much importance to future municipal government, especially in the field of public health, and for the private health welfare, and relief agencies of the city that the census units or forty-acre tracts, or as they are called in other cities, sanitary areas, used by the Federal Census Bureau for the tabulation of population data in 1910 and 1920, be made the basis of all administrative areas of the city, and that both public and private agencies in arranging their field services use districts which include multiples of the census units. In this way the cumulative value of orderly collection of facts will soon contribute to the development of logical programs of action. At present there is little or no data available except by the city as a whole, a unit too large for the detailed analysis now required in intensive public health work. A map showing the sanitary areas will be found in Part II. (Fig. II.)

The densest quarter-mile square sections are found in wards 11 and 12, south of Euclid and east of 14th Street, where the population ranges from 90 to 95 persons per acre. North of Euclid and east of 55th Street there are districts ranging from 50 to 55 persons per acre and on the West Side, in the 4th and 5th wards, the population ranges from 50 to 75 persons per acre for relatively small districts. It will be seen, therefore, that these maximum densities are far below what are termed tenement districts in New York, Chicago and Philadelphia, where 250 persons per acre are quite frequently found over considerable areas. In limited districts as many as 640 people per acre are found in the dense East Side sections of Manhattan Borough of the city of New York.

In Cleveland, therefore, we have no acutely crowded districts and the general average population per acre is about 18 as against 20 for the city of Chicago, 19 for the city of Detroit and 164 for Manhattan Island in New York City.

Greater New York for the whole metropolitan district has about 26 persons per acre as against 13 persons per acre for a similar territory in Cleveland.

The fact that the city has developed east and southeast of the central retail and business districts to a greater degree than west and southwest is accounted for largely by former absence of convenient bridges across the valley of the Cuyahoga River and to lack of development of the water and sewage systems in the southwest side of the city. The general characteristic of Cleveland's residential districts is that of detached one and two-family residences and the result of using this form of homes is to create a city with relatively low population densities and consequent extended areas.

A fact of some possible importance in health development and maintenance of the industrial workers of Cleveland is that a larger portion of them live within easy daily walking distance of their work than is the case in Chicago or Detroit. To quote from the report of the Rapid Transit Commission, "A general inquiry made by us into the question of employment districts and residential locations, develops the fact that there is an unusually large residential grouping of factory workers about their places of employment throughout the city of Cleveland. Thus, two groups of factories on the West Side have 35% and 50%, respectively of their employes within walking distance. On the East Side a factory group in the 79th Street district has 60% walking employes and another in the same district has 75% walkers. Taking the whole East Side group of factories apparently only 15% to 20% of the employes live on the West Side of the city.

This condition is unusual compared with other large cities. In Detroit an exhaustive canvass of the factories showed only one group with 75% of walkers, the balance of factories showing from 16 % to 40% of their employes walking and the average being only 28.2% for the city. In Chicago the situation was similar, the average walkers out of 350,000 factory employes being only 24.4% and any group showing over 40% was unusual. Cleveland has 48% of walkers."

The report on Housing Conditions of War Workers in Cleveland made by the Committee on Housing and Sanitation of the Cleveland Chamber of Commerce and by the United States Home Registration Service in October, 1918, states:

"TIME SPENT IN GOING TO WORK"

> "Out of a total of 21,832 wage earners, 10,364, or 48%, walk to and from their work. This proximity of industry to the home is desirable, and, in a city like Cleveland, with its factories well distributed and accessible to residential sections, it ought not to be impossible. Out of the number who walk, 945 spend from 30 to 60 minutes walking to work or from one to two hours a day in going to and coming from work. * * * * * 52% of the wage earners ride to their work. Of this number 5,059 spend from 30 to 60 minutes riding one way, or from one to two hours going to and coming from work each day. 1,411 spend more than one hour going to work, or more than two hours going and coming from work each day. More than 300 spend more than three hours a day in going to and coming from work each day. These latter figures indicate a waste of time and energy on the part of the worker that must be detrimental to his efficiency as a worker."

For reference there is included here a table of population density per square mile and per acre for Cleveland and its suburbs included within Cuyahoga County. We wish here to acknowledge our debt to the Board of Rapid Transit Commissioners for the privilege of quoting freely from their report in the foregoing pages and for the use of the two charts.

POPULATION AND AREA OF CLEVELAND AND SUBDIVISIONS IN CUYAHOGA COUNTY—1918

Report to Board of Rapid Transit Commissioners

Corporate Name	Population Estimated	Area Sq. Miles	Population Per Sq. Mile	Populatio Per Acre
Cleveland East Side	607,400	39.4	15,416.2	24.1
Cleveland West Side	247,600	19.3	12,829.0	20.0
East Cleveland	25,000	3.0	8,333.3	13.0
Lakewood	42,800	5.4	7,926.0	12.4
Bay Village	608	4.8	126.5	0.2
Bedford Township	1,620	18.7	86.7	0.1
Bedford Village	2,796	2.3	1,215.1	1.9
Beechwood	325	4.5	72.3	0.1
Berea	3,500	1.3	2,692.3	4.2
Bratenahl	1,252	1.0	1,252.0	2.0
Brecksville Township	1,063	28.0	38.1	0.1
Brookpark Village	896	10.2	87.8	0.1
Brooklyn Township	855	4.6	185.6	0.3
Brooklyn Heights Village	592	2.8	211.4	0.3
Chagrin Falls	2,164	2.5	865.6	1.3
Chagrin Falls Township	300	4.8	62.6	0.1
Cleveland Heights	15,000	7.6	1,973.7	3.1
Claribel	1,593	3.5	455.1	0.7
Dover Village	1,800	16.5	109.0	0.2
East View	422	2.2	191.8	0.3
Euclidville	1,500	2.8	535.7	0.8
Euclid Village	3,236	11.4	283.8	0.4
Fairview Village	600	3.5	171.3	0.3
Glenwillow	250	2.8	89.5	0.1
Goldwood Township	498	2.4	207.9	0.3
Idlewood	90	1.9	47.3	0.1
Independence Township	329	5.0	65.8	0.1
Independence Village	1,280	10.0	128.0	0.2
Linndale	366	0.1	3,660.0	5.7
Maple Heights Village	2,200	4.5	488.9	0.8
Mayfield Township	1,160	23.8	48.8	0.1
Middleburg Township	1,838	11.7	157.3	0.2
Newburgh Heights Village, including Cuyahoga Heights Village	3,300	3.8	6,600.0	10.3

North Olmsted Village	1,232	11.9	103.5	0.2
North Randall Village	70	0.5	140.0	0.2
Olmsted Township	1,880	15.6	120.5	0.2
Olmsted Falls Village	560	0.8	700.0	1.1
Orange Township	860	23.5	36.6	0.1
Parma Township	1,866	20.4	89.8	0.1
Parma Heights Village	355	3.9	91.2	0.1
Rocky River	1,855	4.3	431.4	0.7
Royalton Township	1,132	25.5	44.5	0.1
Shaker Heights Village	3,000	4.4	681.8	1.1
South Euclid	2,400	5.8	413.8	0.6
South Newburgh	2,400	13.7	175.2	0.3
Solon Township	990	20.0	49.5	0.1
Strongsville	1,540	24.5	62.9	0.1
Warrensville	391	10.3	38.0	0.1
West Park	8,000	12.9	620.1	1.0
Total	1,002,728	464.1		
Average			2161.0	3.376

Topography and Climate

CLEVELAND occupies an area of 58.7 square miles, extending for about 20 miles along the southern shore of Lake Erie and situated on both sides of the Cuyahoga River where it empties into Lake Erie. Its altitude is 600 feet above sea level.

The gravel, sand, clay and shale which compose the various benches and valleys of the glacial drift deposit which makes the plateau upon which the city is built, vary greatly in their surface drainage qualities from what may be called perfect subsoil drainage in the sand and gravel regions, to impermeable clay and a high ground-water level, for instance in the Collinwood region. The surrounding country is rolling hills with extensive woods and clear open farms. Deep gullies and valleys cut across the plateau in many places within the city limits.

The city is divided for political purposes into 26 wards and 488 precincts.

For purposes of the Federal Census the city is divided into 131 Sanitary Areas, as indicated in Fig. II., Part II.

For convenience in local health administration the city is divided into eight health districts, as indicated on the frontispiece map of this part showing distribution of population.

The watershed is, of course, solely into Lake Erie. The only important relationship between the geological formation and the health of the people is the same that is noticed widely in the lake region where the water supply comes wholly or in large measure from the glacial drift; namely, the prevalence of endemic goitre, which can be found congenitally in young children and widespread among girls and women who have lived continuously in this general area for many years.

CLIMATE

The data obtained from the offices of the United States Weather Bureau in Cleveland show a mean temperature of 26.8° F. for January and of 70.1° F. for July (1871-1918) and for the year 49.0° F. The mean daily range of temperature is 14.7° F. Sudden changes are not uncommon in the fall and winter with northwest winds.

Temperature extremes have varied in the past 48 years from -17° F. in January,—16° F. in February, 4° F. and zero F. in November and 12° F. in December to a maximum of 92° F. in May, 96° F. in June, 97° F. in July, 100° F. in August and 98° F. in September.

There are few instances where the temperatures below zero F. or above 90° F. were recorded for more than four days consecutively.

The mean annual precipitation at Cleveland since 1871 has been 34.39 inches, distributed with remarkable evenness throughout the year.

The mean relative humidity in Cleveland, Buffalo and Detroit at 8 A. M. and 8 P. M. have been recorded as follows:

	8 A. M.			8 P. M.		
	Cleveland	Buffalo	Detroit	Cleveland	Buffalo	Detroit
Winter	79	77	84	75	75	80
Spring	76	73	76	68	70	68
Summer	73	75	75	66	69	64
Fall	77	75	81	70	71	71
Year	76	71	79	70	75	71

Cleveland, as measured by relative humidity in the morning, stands between Buffalo and Detroit, but according to relative humidity at night, Cleveland has less than either of the other two lake cities.

The prevailing winds are westerly, which accounts for the greater cleanness of air and exposed building surfaces and the better vegetation on the west side of the city. The smoke of the valley and the center of the city causes a serious nuisance and menace to health most of the time well out to 105th Street on the East Side, and at some times extending in an appreciable curtain offensive to smell even to the Heights and select residence district further east. At the present rate of industrial development and with the existing indifference to the smoke nuisance, the prevailing winds will in a few years make the fine buildings, Museum, University, etc., on both sides of Wade Park unsightly and the use of them far from attractive. The average velocity of the wind is 13.6 miles per hour, a rate somewhat less than that prevailing in New York City (15.5).

There is nothing important in Cleveland's climate in relation to health. It is a moderate northern climate, typical of the Lake Region, but without excessive humidity, precipitation, winds or extremes of temperature, on the whole a good climate, but its effects for good to a considerable degree offset by the changes produced in the air and light by the constant fall of smoke and fumes that are characteristic of the city and are seen from afar on approaching the city by water.

At a latitude of 41° 30′ and longitude 81° 42′, Cleveland is credited with a possible total hours of sunshine in the year of 4,457.4. By actual measurement Cleveland has in a year 2,367.2 hours of sunshine, or 53.1% of the possible. In the four months of December to March Cleveland has the benefit of only 34% of the theoretically possible hours of sunshine. How much of this loss is due to the unfavorable conditions of smoke pollution of the air cannot be stated.

Housing

THE work, the publications, the influence upon public opinion, upon laws, building construction and sanitary enforcement of ordinances, of the Committee on Housing Conditions of the Cleveland Chamber of Commerce since its appointment in 1912, makes it unnecessary to treat of more than a few of the features of existing housing inadequacies. The City Plan Commission, which is at present developing the necessary maps, the principles and detailed description of uses upon which a zoning ordinance for the city can be approved, is the great constructive force preparing to prevent repetition of past errors and to insure an orderly and safe development of building construction and property uses for the future.

In this interesting American method of municipal control of building and use of property, there is fortunately a common advantage and value appreciated by real estate interests and by those concerned with community health. To eliminate or reduce to the least practicable minimum the erection of tenements is one of the objectives to be desired by sanitarians, because although sanitary conditions may be maintained in premises technically tenements, the lot crowding and the room crowding that usually occur to a greater degree in buildings occupied by three or more families than in single or two-family houses, are found to be accompanied by the three important evidences of unsuitable living conditions: namely, high incidence of communicable disease, high infant mortality rate and high general or crude death rate.

These three conditions prevail in Cleveland as they do in other cities where there is the greatest density of population. Where there is the greatest density of population there is found the worst condition of lot and room crowding. The races found in the worst houses in Cleveland are the Negroes, the Italians, the Jews and the foreign-born Slavs, Slovaks, Lithuanians and Poles. The poor, those ignorant of their rights under the law, in the main the negroes and the foreign-born, suffer not only from the economic disadvantages from which they are emerging, but they do not receive that protection from the law to which they are entitled.

Careful and repeated inspection of what is known as the Hill district, of the Woodland district, of the downtown lodging house district on the East Side, and of the so-called Triangle at the west end of the Superior Avenue bridge, during the winter and spring of 1920, disclosed conditions in violation of all of the important sections of the ordinances dealing with tenements and sanitation of occupied premises.

It was often said by city employes and by others in excuse of the intolerably bad conditions of occupancy in the Hill region that this is all to be demolished in the course of railroad improvements. In the meantime it certainly points to astonishing indifference on the part of the Bureau of Sanitation, which is held responsible for the enforcement of Articles III., IV. and V. of Section A, Articles 76-84 of City Ordinance 32186-A, which was passed October 18, 1915, and in force January 1, 1916 that the conditions reported below could exist, and yet from the evidence of district physicians, sanitary inspectors, visiting nurses and residents, the conditions have existed as reported and found for many years past without any evidence of effective remedial action by the city authorities or by the owners of the properties.

Field notes of the investigator on May 12, 1920, follow. These observations were verified by a medical officer in the city employ, a physician who had had considerable experience in sanitation and epidemiology in the army here and abroad, and whose present work has convinced him of the intimate causal relationship between the filth, neglect, darkness, lack of ventilation and crowding found in the homes, and the amount of invalidism among children and adults in these premises.

Berg Street

Garbage piled high, obstructing the gutter and sidewalk. The pile was two feet high, 10 feet wide and 16 feet long. Maggots were developing in this pile of garbage, human and animal excrement and food waste.

Between Berg and Jerome Court

Yard privies with broken seats, fecal deposits on floor, seats and side of privies, obstructing drain. Bowl filled with human waste. (No lights in any of the halls visited through this inspection trip, neither fixtures nor tips for lighting). Had typhoid fever case here last year.

Jerome Alley

Garbage bins at 707 filled with rotting accumulation of winter. In the house, husband and wife and six children in two rooms. No gas, no lamps; yard closets, no water running, privies have broken bowl surface, rotting wood sides, floor and roof, general distribution of human and animal fecal waste.

Between Berg and Jerome Court

Garbage in mass, acrid, stinking, fly breeding.

703 Berg Street

Three rooms, two adults and three children. No provision for lighting; cooking, washing and sleeping in same room. In sheds, under stairways, rabbits, pigeons and chickens breeding and at large. Privies in foul, unsanitary condition; surface and privy drainage washing upon alley where children are playing.

General Area

Central, Hill, Berg and Commerce down to the flats. A mass of shacks not fit for cattle to be kept in. Spaces between buildings from six inches to two feet wide, packed with rotting accumulations thrown in from the alleys above. Privy vaults and sink holes that are not protected against leakage of fecal accumulations to surrounding area, accessible to children and occupants of premises.

1. BACK OF BERG STREET, OVERLOOKING JEROME COURT

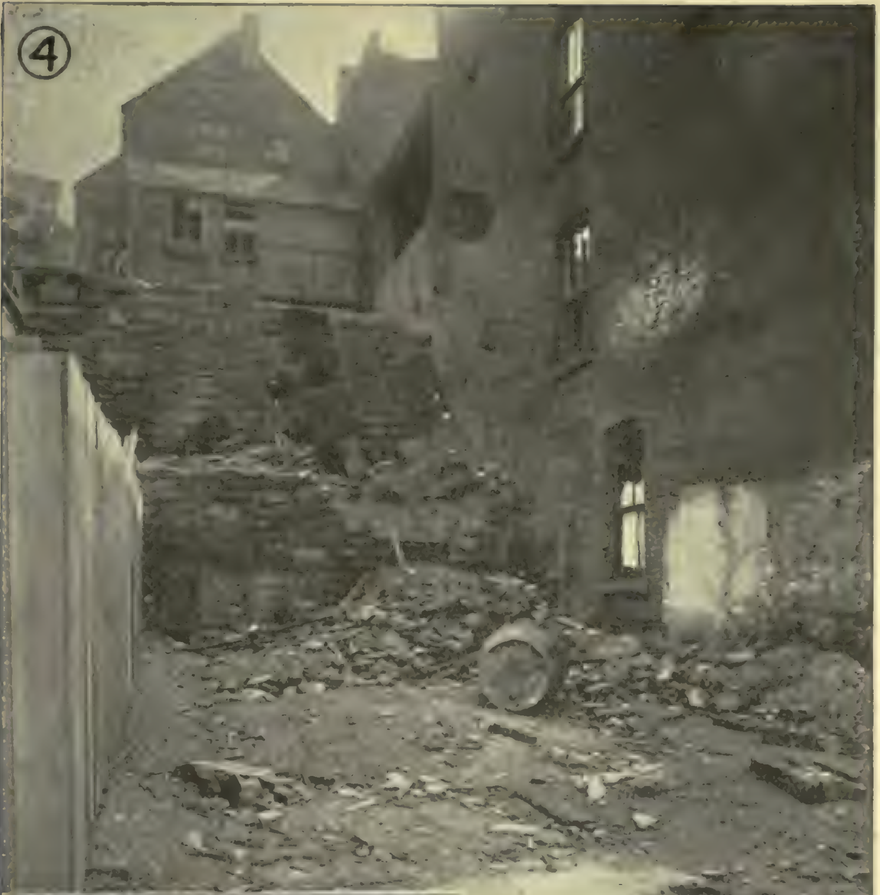
This truant boy "gets away from the kids" in his "reading-room" at the rear of an out-house on Berg Street.

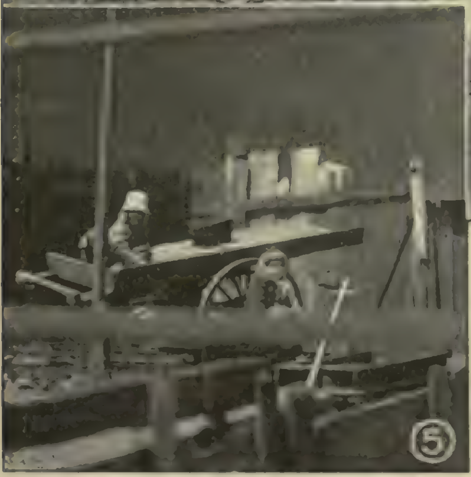
2. JEROME COURT, HAYMARKET DISTRICT

Making mud-pies on "the Boulevard," which some facetious tenant has christened Jerome Court. The children are playing in and around an open privy.

3. ON ANDES ALLEY

DEPARTMENT OF SCIENCE University of Toronto



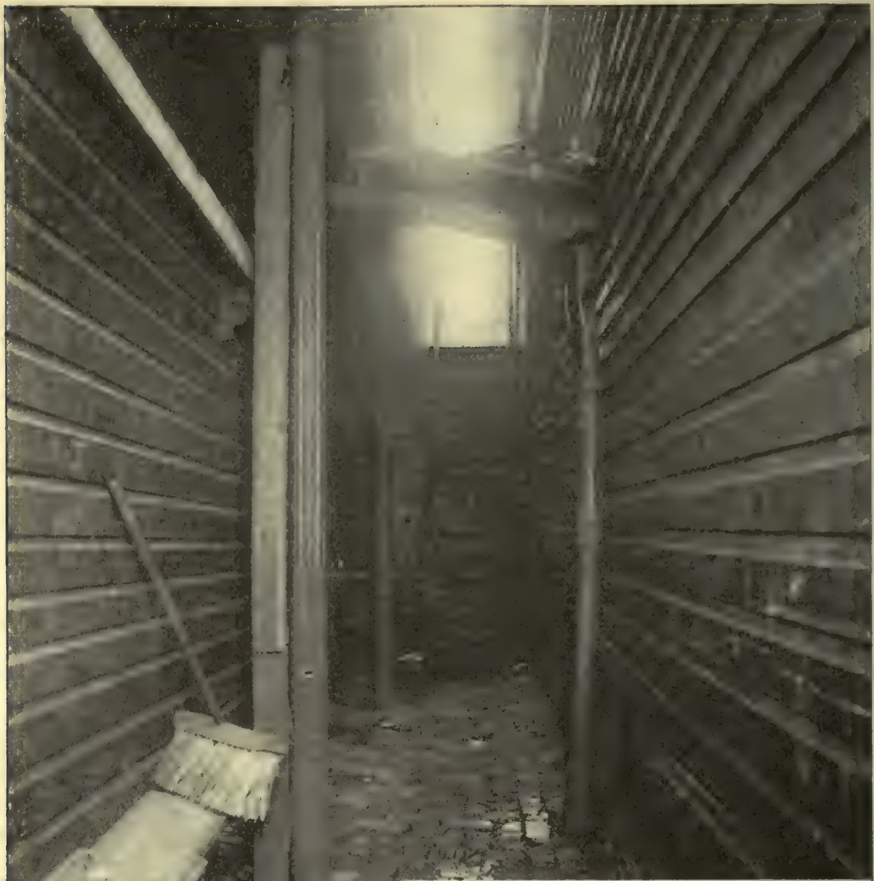


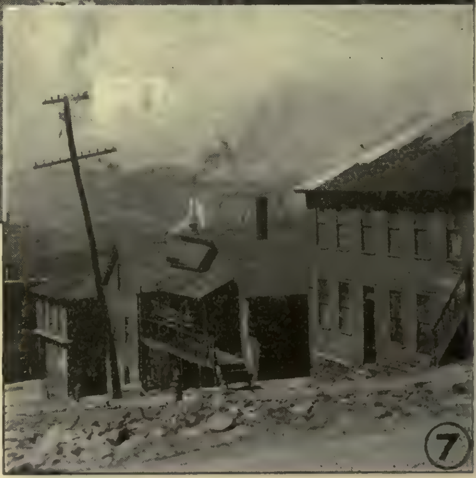
4. VACANT LOT ON JEROME COURT

The tearing down of buildings has been begun here but left unfinished.

This lot and two others are the only playground space for many children living in this district.

5. A BACKYARD PLAYGROUND IN HAYMARKET DISTRICT.





6. Passageway up the Hill from the River Between Tenements.

It is possible to walk up from Canal Road to Andes Alley on five streets through such passages. No sunlight can reach the rooms which open off these passages.

7. Mencken and Hill Streets, Haymarket District

This view shows how houses are built up the East Ninth Street hill between Mencken and Hill Streets. Some of the dwellings are nothing more than burrows in the ground. One can go into a tenement on Mencken Street and by means of rickety stairs wend his way across Jerome Court, Berg Street and out on Hill without seeing the light of day.

From observations made it would appear that Article III., Sections 53, 54, 55, 56-2 and 4, and 59, referring to buildings used as tenements before January 1, 1916, were violated on most of the premises inspected.

Complaints and reports of the conditions as noted above had been made at intervals over a period of a year with no remedial action by the Bureau of Sanitation.

In another section, where the excuse of impending demolition of premises couldnot be offered, quite similar conditions were found, as follows:

Orange Avenue, opposite Depot

Broken toilets, garbage accumulation which has been on premises since August, 1919.

2003 Orange Avenue

Broken toilets, ho lights in hall, alley with all winter accumulation of garbage.

2515 Orange Avenue

Privy with leaky sewer outlet where bowl waste discharges into open pit, rotting boards on floor of shanty. Pile of manure in yard since August, 1919.

2515 Orange Avenue, Second Floor

Toilet opening into the kitchen and living room. No ventilation except through the kitchen. Dangerously loose flooring. No lighting in halls.

The worst conditions were found in lodging houses. With the exception of the lodging houses maintained by the Salvation Army, which complied with legal requirements and presented a picture of order and cleanliness, the lodging houses in Cleveland, including the one maintained by the New York Central Railroad in the basement of the Orange Avenue Freight depot, violated all reasonable provisions for sanitary living and disease prevention. Among the most important nuisances found were inadequate light and ventilation, old, soiled, stained bed covering, filthy floors, overcrowding, lack of space between bunks, etc. The licenses issued by the State Fire Marshal at Columbus, Ohio, are obtained without compliance with reasonable standards of cleanliness. There is no routine periodical inspection of lodging houses by state or city authorities. The cheapest lodging houses operated in the densest areas of New York's lower East Side shine by comparison with Cleveland's "flop-houses," which are a disgrace.

In response to the frequent specific complaints by the district physicians of unsanitary conditions in lodging houses, the Bureau of Sanitation offers the excuse that there is no authority under the law to abate the nuisances described.

The following extracts from notes of the investigator give a typical picture of Cleveland's lodging houses, the clean and the filthy:

Salvation Army Citadel

Has provision for 166 men, each in single partitioned rooms, the partitions going to within two feet of the ceiling, the space above being divided by an iron grill. Each room has 48 feet of floor space and 480 cubic feet of air space. Toilet seats clogged and foul because of use of toilet paper instead of towels for drying hands in the wash places. Premises otherwise clean, with clean linen on beds, clean towels supplied each night. License to operate obtained from the Department of State Fire Marshal, at Columbus, $15.00 a year. Original inspection of premises is made by representative from Columbus. No re-inspection. Occasionally visited by sanitary officer of Cleveland Health Division.

Metropole

Another Salvation Army lodging house where a license of $20.00 a year is paid, having accommodation for more than 200 men. Some single rooms as described above (Citadel), others large, well-ventilated, high-ceilinged dormitories, the beds being double-tier iron-spring bunks. Each separate room having a floor space of 40 square feet and air space of 400 cubic feet, the dormitory having 45 square feet of space per individual and 450 cubic feet air space per capita. Premises in clean condition. Shower baths in cellar. Laundry tubs for men to wash clothes and drying room for their use. Usual standards of simplicity and adequate cleanliness that one finds in Salvation Army quarters. Occasionally inspected by the Health Division. Charge of 50 cents per room and 35 cents per bed in dormintory.

Palisades, 2146 Ontario Street

One flight up to pool room, lunch counter, general lounging room and a few unlighted, unventilated cabins with semi-partitions, the ceiling of each being formed by wire gratings on which newspapers, rags and rubbish have accumulated almost to the exclusion of air. Two floors above this used for lodging purposes, the rooms being wholly inadequate as to light, floor space and cubic air space. The washrooms are filthy, the bedding old, the single sheet and so-called pillow case being grey and brown with dirt and discharges, the mattresses stained and torn, the coverlets filthy with stains of vermin and men. The per capita floor space allowed was 35 square feet and the air space 280 cubic feet. There was no light in the separate rooms and many of the rooms were pitch dark in the middle of a bright afternoon. Kerosene lamps were had by some of the men in the rooms and some of the rooms were furnished by the men with all kinds of personal belongings. Men were found who had lived in these rooms for months at a time at $2.00 a week. No proprietor or clerk on the premises and did not learn whether place was licensed. Neither as to cleanliness, air space, bedding or lighting does this building comply with what are recognized standards for even the cheapest lodging houses in New York City.

131 West Prospect Avenue

Two-story building. First floor occupied by lunch counter, kitchen, lounge room and card room. Crowded with Negroes, Italians, Poles, etc. Eleven sleeping rooms on the second floor in rear; the proprietor occupying the front. These rooms are furnished with beds with filthy mattresses and bedding. Some beds double. Some rooms with two cots. Floor space 35 square feet per capita. The rooms with the exception of one had each an outside window. This place has no license because the inspector from Columbus said that with so small a number of rooms it was unnecessary to have a license.

The serving of food in the restaurant on the ground floor was under the foulest imaginable conditions. Butter was picked out of the bowls with dirty hands. Food for serving was standing around on the floor in the kitchen and behind the lunch counter. No order, cleanliness or provision for decent washing of dishes or hands. The apparently total neglect of all provision for decent food preparation is one of the striking features observed on visiting a large number of eating houses and lunch counters feeding the transient or lodging-house public of the city.

Lodging House maintained at the New York Central Freight Depot

132 men were in one cellar space entirely below ground excepting for a space of six inches which permits of partially open windows, looking out at street level on one side and on car tracks upon the other. Cubic space 240 feet per capita. Double-deck bunks, some for two people each; bunks two and three tiers deep, so close together that a sick man must be reached over the foot of the bed for examination and treatment. Only artificial light possible. Provision for toilets and wash basins excellent and adequate. Another room for 72 men, 290 cubic feet per capita, with the same double-deck bunks in two and three rows, a place with insufficient ventilation and light to permit of the requirements of housing and unfit for human habitation according to the Building Code of almost any of the cities of the United States. Reported by district physician to be a constant source for medical care at the expense of the city through the winter, when the condition, due to lack of ventilation, was beyond belief. There was no medical care provided by the company for this group of not less than 200 and frequently 250 to 300 men. One exhaust fan opening out at the level of the railroad tracks offers opportunity for change of air, but in winter the windows were kept shut constantly, and the intake of air must come in any event from the street level with all the dust of the large truck spaces of the freight yard.

RECOMMENDATIONS

It is recommended that:

The activities of the Chamber of Commerce in the interest of suitable housing in single or two-family buildings be continued, and that there be added to the present important financial undertaking to facilitate home building for wage earners, educational propaganda among householders as to proper and legal standards of construction, equipment and occupancy of living premises, so that those owning or renting homes may know their own duties and privileges or rights, as well as the degree and kind of protection they are entitled to at the hands of the city government for the protection of their health.

The undertaking of the City Plan Commission to establish a plan by zones for the construction and use of buildings be vigorously and continuously supported by all civic agencies such as the Chamber of Commerce, the Welfare Federation, the Consumers' League, etc., until the city government has enacted into law adequate restrictions and provisions for the future.

The existing laws affecting the occupancy of premises, whether tenements, lodging houses or single-family houses now used for multiple family use, be enforced consistently, impartially and vigorously, to the end that the existing disgraceful conditions in and about living quarters of the poor in Cleveland be abated.

The proposed Sanitary Code be enacted into law at the earliest possible date to give the Division of Health the necessary authority to take action in lodging houses and to enforce the abatement of nuisances.

The authority to license, inspect, control and close lodging houses in Cleveland be vested in the office of the Commissioner of Health or the Director of Welfare of Cleveland, if necessary, as the agent of the State Fire Marshal at Columbus.

Water Supply

WITHOUT repeating the historical record of events, it may be briefly stated here that Cleveland has been through the same phases of indifference, alarm, actual fear, confidence and now pride with regard to its municipal water supply which has been characteristic of many lake cities. Cleveland's water supply is now protected by the location of intake in the lake, by filtration and by chlorination, so that the citizens receive, except in a small part of the city for which filtered water cannot be obtained until construction already planned for is completed, a safe, potable water, attractive in appearance and suitable for all domestic and commercial uses. There is no reason to believe that communicable disease of any kind is now distributed by the public water supply. No one in Cleveland needs to buy bottled waters, except to satisfy some whim of taste or appearance.

The source of supply is obviously adequate through the two intakes about four and one-half miles from the shore in Lake Erie. One crib is of the exposed, the other of the submerged type. Tunnels connect these cribs with the pumping stations at the foot of East 49th Street and on Division Avenue, at the foot of West 45th Street, 90 per cent of the pumpage being done at present at the latter station, where the filtration plant is in operation, with a daily capacity of about 150,000,000 gallons. Steel pipe lines carry the raw water to the chemical house whence it passes to the mixing chamber. Sulphate of iron (110-140 lbs. per million gallons) and lime (85-100 lbs. per million gallons) are supplied automatically in solution to the raw water in the steel pipe lines, according to the rate of flow and the condition of the water. Coagulation of removable matter is facilitated in the mixing chambers, and the settling out takes place between the mixing chambers and the filter buildings.

The filters are cleaned every 10 to 40 hours, according to the condition of the water, by reversing the flow through the beds. The filtered water is stored in a 20 million gallon reservoir, whence it is distributed by pumps through the city pipe system. The lake water carries but little suspended matter for most of the year and purification is needed chiefly to reduce the bacterial content of the water. There is a reservoir for surplus water. At the matter for most of the year and purification is needed chiefly to reduce bacterial content of the water. There is a reservoir for surplus water. At the pumping station on the East Side the process is identical except that filtration is not yet provided, though planned for. Most of the water distributed to the East Side of the city, as well as all that for the West Side, comes from the West Side station and has been filtered as well as chlorinated.

Complaints of unpleasant taste in the water have been found justified at times, not because of excessive or irregular use of lime or chemicals applied at the pumping stations, but because of pollution of the water in the vicinity of the intake cribs by melting ice or obstructed flow from the Cuyahoga River, which occurs under certain conditions of wind and temperature, and always in the winter season.

The water is tested daily both by the laboratory of the Water Division of the Department of Public Utilities and by the laboratory of the Division of Health, samples being taken regularly from points at the pumping station before and after filtration and chlorination, and at various police stations and other suitable points in the city. Tables giving the results of chemical and bacteriological tests made at the two laboratories show consistent findings in the effect of chlorine treatment (.271-.454 parts per million) in diminishing the occurrence of the presumptive test for fermentative organisms (according to standards proposed by the American Public Health Association), and also give evidence of the uniformity in tests made of water collected at widely distributed points on both sides of the city.

One of the very considerable economies to the householder is the degree of softness of the public water supply provided by the method of treatment. The saving in soap alone to the people of Cleveland is worth many times the cost of chemical treatment of the water. When the plans already decided upon are completed there will be pumped and filtered water in abundance for one and a half to two million people.

The city sells water to Lakewood, East Cleveland, Cleveland Heights, Shaker Heights and West Park. The city is metered and wasted water is paid for. Water is now furnished for a population of about one million people who reside in an area of about 110 square miles. The average rate of consumption is estimated at from 130 to 135 million gallons daily and the maximum rate of consumption at 200 million gallons daily. Nearly the entire pumpage is accounted for, a fact which would indicate that the distribution system is in good condition. Improvements in the water supply and distribution have always been more than met by the water rates, which are not excessive.

The growth of Cleveland and its vicinity is an assured fact, consequently, at intervals water facilities must be increased to meet the growing demand. With sewage treatment provided only to the extent of safeguarding bathing beach waters and minimizing the foul condition of the Cuyahoga River, the contamination of the lake shore waters will increase with the growth of the city. Therefore, in completing present plans and in making future ones the filtration of the city water should be considered of paramount importance.

With two filtration plants, each with a capacity of 150 million gallons daily, it seems that pure and wholesome water will be furnished this community for a number of years. However, recently a committee of Engineers, Messrs. Hoffman, Herron & Frazier, studied the future requirements of the Water Department and concluded that by the year 1940 two additional filtration plants, one east and one west of the Cuyohoga River, would probably be necessary.

There is no reason to believe that the water supply is responsible for any of the typhoid fever, dysentery or other diarrheal diseases reported and analyzed, since chlorination of the entire supply was established. The very low typhoid rate of Cleveland during the year 1919 is an excellent proof of the safety of the public water supply.

With regard to private unauthorized and individual well supplies of water used in the outlying districts of the city and its suburbs not yet reached by the public supply, the situation is unsatisfactory. There is no map or census of these supplies, and there is no system of inspection, or permit system controlling the use of other than public water supplies by the Division of Health. Some of the cases of enteric infection, for which the source has not been traced in the great majority of cases may well be due to individual well supplies exposed to surface or other contamination regularly or occasionally. No one should be permitted to use water supply other than the public source unless the quality of water and the sanitary safety of its environment and drainage area are known to the Division of Health and a permit or license for the use of such water is issued and only on the basis of bacteriological and sanitary control at frequent intervals.

It is recommended that:

The plans for filtration as prepared for the East 45th Street pumping station be carried to completion and that the present chemical and bacteriological standards for quality and purity of the water supply be maintained.

The Division of Health make a careful survey to locate all sources of water supply in Cleveland other than the public supply and permit the use of only such as are found by chemical, bacteriological and sanitary standards to be continuously fit for human use.

Sewage Disposal*

WHERE, as in Cleveland, the drinking water is taken from the same natural source into which surface drainage and household and industrial sewage naturally empties by gravity, the collection, treatment and disposal of sewage becomes of almost as much importance as the purification of the water supply. Moreover, the use of the lake shore and beaches in and near the city for recreation purposes, boating, paddling, bathing, etc., is an added reason to exclude or reduce to a safe dilution the sewage effluent. Cleveland's present sewer system for collection, the facilities for treatment and the location of discharge outlets in deep water far from shore, as constructed or planned for, and under contract, represent the best engineering opinion and the result of important practical experiments with a great variety of treatment and disposal methods.

Until the city has so treated its own sewage from the areas which will contribute to the discharge into the upper part of the Cuyahoga River as to escape criticism and avoid nuisance, the industrial plants along the banks of the river cannot be required to abate the nuisances they are so obviously and so offensively guilty of at present. The opportunities for the great industries of Cleveland to contribute to the cleanliness of air and water are so ample that one would think they might tempt the imagination of some engineer among them.

The bird that fouls its own nest is a true "white-wing" in comparison with the collection of industrial plants upon the flats of the Cuyahoga River.

The Cleveland program includes the controlling of the purity of the drinking water by treatment during the immediate future in two large filtration plants and the safeguarding of the bathing beach waters from sewage pollution by treating the sewage in three large treatment plants. Treating the sewage is the first major step in eliminating the foul and objectionable conditions existing in the water of Cuyahoga River, while another benefit to be derived pertains to the prevention of the overtaxing or overloading the reasonable performance of the water purification plants. Another important benefit to be expected, although chiefly sentimental, is the meeting of the opposition of the public to the use of a source of water for drinking purposes in which there exists even a suspicion of sewage pollution.

The policy which has been adopted in Cleveland is similar to that in general use in this country and abroad, namely: controlling the purity of the water by filtration and treating the sewage only to a partial extent. Lake Erie waters near centers of population are becoming, year by year, less reliable as a source for a water supply without treatment. Filtration in conjunction with sterilizing agents will alone make the public water supply of this community satisfactory under existing conditions, and it is with this viewpoint in mind that the problem of sewage treatment has been dealt with. With efficient operation of both water and sewage plants two barriers against the contamination of the water supply will be established.

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* The Survey is indebted to various officers in the employ of the city for most of the information regarding water supply and sewage in Cleveland, and in particular we wish to acknowledge the important statements of fact obtained from—

Mr. George B. Gascoigne, Sanitary Engineer, Division of Engineering of the Department of Public Service, and

Dr. Roger Perkins, Chief of the Bureau of Laboratories of the Division of Health and Professor of Bacteriology and Hygiene at the Western Reserve University Medical School.

The program adopted is representative of the progressive spirit in the community and it should be consummated in its entirety. It demands the attention of the public until all of the contemplated structures are in use, and it should be stated that the efficient operation of the sewerage and sewage treatment works is just as important as the installation of the works.

SEWERAGE

The city of Cleveland is sewered upon the combined plan, *i. e.*, one set of sewers cares for the storm water and sewage. Lake Erie is the ultimate dumping ground for all the sewage flowing through the city system, which may be described as a series of main sewers having outlets for excess storm water emptying either directly into the lake or into streams tributary thereto. The sanitary sewage, together with the first flush of storm water, is to be collected from the above-mentioned main sewers by means of a system of intercepting sewers which discharge at the selected points for treatment. These treatment sites are three in number, two on the lake front and one on the Cuyahoga River.

The first sewers were built in Cleveland about 70 years ago, and today we find very few of these in use. The rapid growth of the city has made necessary the construction of many miles of sewers. However, the increase in sewer mileage apparently has not kept pace with the increase in street mileage. There are many factors governing this condition, principal among which is the inadequacy of financing.

The demand for sewers includes projects for main sewers, some of which are partially completed, sewers for recently annexed portions of the city and sewers for undeveloped portions. Furthermore, there are many sewers needing rebuilding in advance of paving, and there are a number of streams which must be maintained as storm water channels which should be converted into storm sewers. The city now has about 17 miles of streets and only about 15 miles of sewers to the square mile. In order to make the sewer mileage equal to the street mileage, an additional sewer length of about 106 miles would be required.

It is found that the city has been expending for sewer purposes about $1,000,000 each year. Mr. Robert Hoffman, Commissioner of Engineering and Construction, estimates that the city will need to expend about $1,000,000 each year for the next 10 to 15 years before it can provide sewerage facilities commensurate with the present and future demand. Available data tend to show that at the present time the city is about 88 per cent sewered, a ratio which compares favorably with that found in most of the larger cities.

Under existing laws the city as a whole must pay the cost of sewers located within street intersections and at least two per cent of the remaining cost. Abutting property can not be assessed for more than would be required to pay the cost of a local sewer, so that the excess cost of any branch or main sewer over or above what a local sewer would cost must be borne by the city as a whole. This portion of the cost is substantial and accounts in large measure for the amount the city must pay. The city's portion of the cost is usually financed through the sale of bonds issued for such purposes, but the amount of bonds which can be issued is limited in a number of ways.

SEWAGE TREATMENT

There is evidence that the bathing beach waters along the lake front are polluted by sewage now discharged at the main sewer outlets and at times by the storm-water emergency outlets discharging diluted sewage. Proof of the origin and spread of communicable diseases by sewage-polluted water used for bathing purposes, is difficult to obtain, but sufficient instances of typhoid fever, non-specific intestinal infections and of infectious conjunctivitis have been observed in New York City and elsewhere as the result of unrestricted use of bathing beaches near sewer outfalls, justify our protecting bathing waters against pollution or forbidding bathing when the pollution can be demonstrated. Bacteriological proof of the degree of sewage pollution is usually unnecessary, for sight and smell suffice to give warning and evidence. The locations for the sewage plants, together with the degree of treatment necessary and the type of sewage plants best suited to local conditions, were determined from tests on the sewage discharged at the East 140th Street and the West 58th Street outlets.

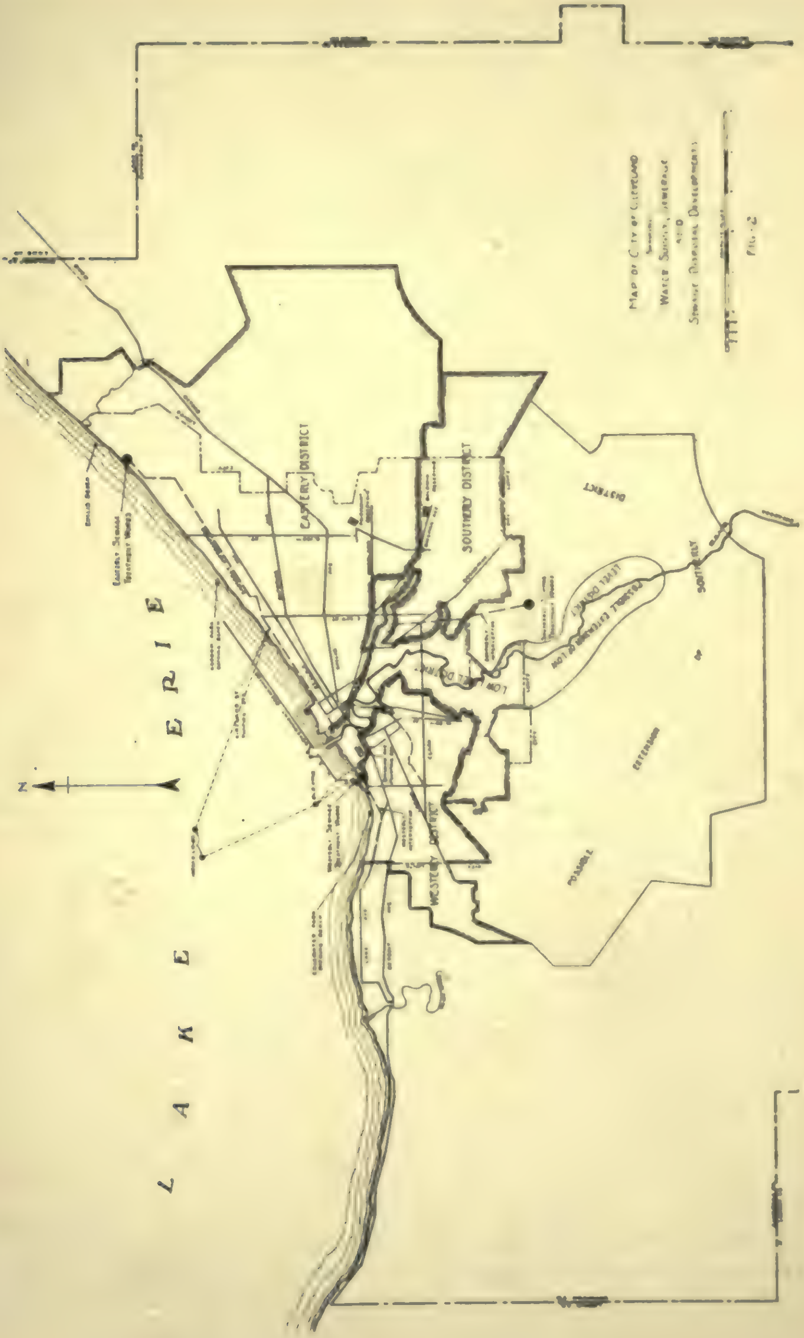
The city, as may be seen from the accompanying map, has been divided into four main sewerage districts: the Westerly, Easterly, Southerly and Low Level. Each district, with the exception of the Low Level, has a main intercepting sewer to deliver sewage to the treatment site, and the population served in each district amounts to, approximately, 27 per cent, 50 per cent, 22 per cent and 1 per cent of the total population of the city, respectively. The sewage of the Westerly and Easterly districts will be treated at two lake-front plants, while the sewage from the remainder of the city will be treated at a plant located on the Cuyahoga River, about seven miles from its mouth. Since lake water is not available at this site, it appears that ultimately structures which provide a higher degree of treatment than at the lake-front sites will be necessary at this site. Since contemplated river and harbor improvements along the Cuyahoga River involve an extensive plan for straightening the river channel, the problem of sewage disposal for the Low Level district which bounds the river is rendered especially uncertain at this time.

The primary results to be accomplished by sewage treatment works may be listed as follows:

Preventing the pollution of bathing beach waters along the lake front.

Eliminating the foul condition of the Cuyahoga River.

At the Westerly site there has been constructed a submerged outfall, and a complete sewage treatment plant is now under construction. It is expected that this will be completed and in continuous operation by the bathing season of 1921. At the Easterly site, shore protection works, outfall pipes


MAP OF CITY OF CLEVELAND
SHOWING
WATER SUPPLY, SEWERAGE
AND
SEWAGE DISPOSAL DEVELOPMENTS
FIG. 2
LAKE ERIE
N
EASTERLY DISTRICT
SOUTHERLY DISTRICT
WESTERLY DISTRICT
LOW LEVEL DISTRICT
EASTERLY SEWAGE TREATMENT WORKS
WESTERLY SEWAGE TREATMENT WORKS
SOUTHERLY
DISTRICT
EXTENSION
POSSIBLE

and a building for the housing of disinfection equipment have been constructed. There is now under construction at this site a sewage plant for partial treatment which is expected to be completed and ready for operation by the bathing season of 1921. At the Southerly site the river has been straightened and a portion of the excavation has been made for the sewage plant.

When the two lake front plants are completed they will provide for removing the inorganic matter of sewage by sedimentation in grit chambers, and the removal of settleable organic matter by settling in two-story tanks. During the bathing season the tank-treated sewage is to be chlorinated and dispersed in wide areas about one-half mile off shore by means of submerged outfalls. Should it be possible to proceed at this time with a plant at the up-river or Southerly site it would probably provide, in addition to the tank treatment mentioned above, oxidation of the sewage in sprinkling filters. However, the final selection of the type of plant to be constructed at this site will be deferred until funds are available. Thus it is seen that definite and substantial progress is being made to prevent the sewage pollution of the bathing beach waters.

FINANCIAL ASPECT OF PROBLEM

The Water Department of the city of Cleveland is able to charge rates which are consistent with the cost of supplying a purified water to all parts of the city. This applies not only to providing funds for operating the water works in an efficient and economical manner, but also for retiring bonds incident to new construction work. The cost of constructing and operating filtration plants necessarily increases the cost to the city of supplying water. In addition to this increase the cost of labor and supplies have also advanced. To take care of the additional cost, the water rates were recently increased 50 per cent, so that domestic consumers within the city are now charged 60 cents per thousand cubic feet. This charge is reasonable and is in line with that found in other large cities of this country.

The problem of additional funds for sewage and sewage disposal works may be classified under two headings: namely, funds for construction work and funds for the operation and maintenance of the various sewage plants.

Funds for constructing the sewage disposal plants were provided by bond issues and their authorization was approved by a vote of the people. Since such bonds were provided in compliance with orders from the State Department of Health they were issued in addition to the usual limits governing the bonded indebtedness of the city. When an increase in the tax levy beyond the prescribed limits sufficient to provide for the sinking fund and interest charges upon sewage disposal bonds becomes necessary, it requires a vote of the people.

There had been expended by January 1, 1920, upon the sewage disposal project about $2,650,000 and there was available at that time $1,330,000 additional. The cost of completing the two lake front plants is estimated at $1,260,000, which means that available funds will be practically depleted when the two lake front plants are in operation.

In order to complete the Southerly Interceptor Sewer, with connections, and the Southerly treatments works, additional funds to the extent of practically $2,000,000 must be provided.

The statutes of the state of Ohio do not permit levying taxes outside the usual limits, for the operation and maintenance of sewage disposal improvements. The time is rapidly approaching when the question of increasing the present tax levy to provide operation funds for this purpose must receive consideration and be settled.

The problem of providing funds for any sewers is difficult, yet it should be appreciated that the city must keep pace with the demand. This demand is great enough to require, during the next 15 years, an annual expenditure by the city of approximately $1,000,000. The real problem confronting the city as regards sewerage facilities pertains to the method which shall be adopted in financing such improvements.

The result of failure to supply sewers and keep pace with the settlements and building projects in the outlying parts of the city can be seen, perhaps, in its typical expression in the Collinwood region, where the kitchen waste and overflow from numerous shallow cesspools and privy vaults is carried in open gutters behind rows of houses across sidewalks and through devious channels, until the foul-smelling stream seeps away if the ground is dry or reaches Nottingham Creek if the clay soil cannot absorb it. Nothing can so successfully discourage attempts by the householder and the sanitary police to maintain decent surroundings for the little children of such regions as the absence of sewers while the public water supply is everywhere available. A sewer is about as essential as a trolley line to develop suburbs and distribute families away from the packed tenements of the city.

One particularly foul spot was found adjacent to the city filtration plant: namely, at Bentley Court, where a small area inhabited fairly densely by people of small means is entirely unsewered. Here the slops and privy vaults overflow and leakage from a row of houses has made a small swamp alongside of what serves as a roadway, where domestic animals and children find entertainment, and where the passerby holds his nose for the stench. It takes a high grade of intelligence, constant industry and real discipline to live at close quarters and not create nuisances, where sewers are lacking and water supply is provided.

SUMMARY

The problem of safeguarding the health of any community by supplying a pure water and by removing the sewage pollution from bathing beach waters warrants considerable attention by the public. This is especially true in a large and growing community. During the past few years these problems have been studied actively and conscientiously in Cleveland, with the result that comprehensive plans for providing suitable water supply, sewerage and sewage disposal facilities have been adopted and are being carried out with substantial progress to date.* The situation may be summarized as follows:

> 1. While the domestic supply of water in the City of Cleveland and vicinity can not be considered entirely satisfactory, physically and hygienically, without treatment, excellent progress has been made to furnish a pure water supply by means of intakes suitably located off-shore and by adequate filtration and chlorination.
>
> 2. Progress is being made in providing sewerage facilities. However, the demand for sewers is extraordinary at this time, and this demand, because of the rapid expansion of the city, will continue during the immediate future. In order to meet this demand expenditures of large sums must be made for sewers.
>
> 3. The bathing beach waters along the lake front are subjected to continuous pollution from sewage discharged at the outfalls, and to occasional pollution from diluted sewage discharged from storm water overflow outlets.
>
> The foul condition of the Cuyahoga River has long been a source of complaint. While correcting this condition may be considered partly a sentimental or comfort problem, sight should not be lost of the fact that this stream with its polluting materials is a direct menace to the water supply.
>
> 4. An investment of approximately $4,000,000 for sewage treatment devices will be rendered practically worthless unless funds are provided to operate and maintain such works in an efficient manner. The question of providing such funds should be given serious consideration in the immediate future.

RECOMMENDATIONS

It is recommended that:

The City persevere with its present excellent plan for sewage collection treatment and disposal.

For sewer extensions the sum of $1,000,000 be provided annually for the next fifteen years, to permit of a wise and consistent development of the present plan and to permit of economies in construction.

Cooperation be arranged for between the Park Department, the Public Service Department and the Division of Health to assure protection of the public against risk of infection from bathing at the public beaches in or near the city when there has been direct or emergency overflow contamination near the beaches, due to heavy rainfall in summer.

Funds be provided to operate and maintain the sewage treatment works in the manner intended at the time of construction.

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* For those who wish to test the standards Cleveland has set for itself in its present plans for proper collection and disposal of sewage, an excellent summary of standards methods and authoritative reference to the best present-day American practice can be found in the special article on this subject by Hommon, Hoskins, Streeter, Tarbett and Wagenhals in the U. S. Public Health Report (January 16, 1920, Vol. 35, No. 3).

Street Cleaning and the Collection and Disposal of Garbage and Refuse*

ONE of the most important municipal problems in any city is the cleaning of streets and the collection and disposal of garbage and other refuse.

The streets may be efficiently lighted, well paved and sewered, but from a health standpoint how much more essential is it that they be well cleaned. Houses are constructed with all modern improvements, including provision for ventilation, with sewer connections, etc., but it is essential for the occupants that the refuse be speedily and systematically removed.

We hear much at present in regard to parks and playgrounds for congested districts, in order to secure for the people who live and work in these districts better hygienic conditions. Dr. Peterson, former supervisor of playgrounds of Cleveland, estimated that the supervised playgrounds in Cleveland would accommodate 20,000 children; more than 105,000, he said, will have to play in the streets. In discussing parks and playgrounds how little we hear of keeping the streets, alleys, yards, courts and premises in a cleanly condition, to secure cleanliness of the streets for the people who live in the congested sections, to protect the air they breathe, the houses they live in, the shops they work in, their recreation grounds. Undoubtedly a large number of people spend their lives from beginning to end in an area, the healthfulness of which is controlled for good or bad, according to the method adopted for cleanliness.

The work in connection with the cleanliness of the city, consisting in the cleaning of streets and the collection and disposal of refuse and garbage, is under the direction of the Director of Public Service, carried on by branches of the Service Department.

GARBAGE COLLECTION AND DISPOSAL

Prior to 1897 there was no systematic method for collection and disposal of garbage—the garbage being collected by contractors, who made collections from all portions of the city and disposed of the material by taking it several miles out into the lake and there dumping it. The method of disposal was not satisfactory on account of the excessive cost and the littering of the shores with floating debris. During the period previous to 1897 a portion of the garbage was disposed of by feeding to swine on farms in the outlying districts. This method was not satisfactory and was finally condemned by the local health authorities.

In 1897 a contract was awarded for collection and disposal for a period of five years, the contract being sublet to the Newburgh Reduction Company, with a plant located at Willow, on the Baltimore & Ohio Railroad just south of Cleveland. At the expiration of the contract it was not renewed but the contractor continued to perform the work until January 1, 1905, at the same price specified in the contract, $69,400 per year.

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*This chapter was prepared from a report written for the Survey by Mr. I. S. Osborn, an engineer of Cleveland recently engaged by the city government to make an exhaustive study of the problem of municipal collection and disposal of wastes. The Survey is privileged to present this statement before the completion of the official report.

On January 1, 1905, the entire equipment for collection and disposal of garbage was purchased by the city and since then has been operated by the municipality.

The methods of collection have remained, with few changes, the same as when the work was taken over by the municipality. The original horse-drawn wagons purchased by the city from the contractor had a removable box, which was removed from the wagon when filled and shipped to the disposal works, with an empty box returned and placed on the wagon for use in the next collection.

In 1907, two years after the purchase of the equipment by the city, changes and improvements were made by the purchase of new collection wagons and new steel garbage cars, as made necessary by improvements in the methods of handling the garbage at the disposal works.

At present the garbage is collected from the various sections of the city in steel-body wagons, in which it is delivered to the central receiving stations where it is dumped into steel cars and shipped to the reduction works at Willow.

The collection and disposal of garbage are supervised by two superintendents, one having charge of collection and the other of the final disposal. The superintendent of collection has general charge of the equipment and work of the collection department. Under him are employed 250 men, engaged in the work of collection and maintenance of equipment and stables. The superintendent of disposal is in charge of the reduction works. Under him are employed approximately 100 men, including foremen, mechanics, operators and laborers.

Garbage is collected from all sections of the city, which has an area of 58.7 square miles, and a population of 796,836. The total area of the city is divided into 101 collection districts. The areas of the districts vary from a quarter square mile to one square mile or more, depending on the density of population and quantity of material to be collected. It is the intention in establishing collection districts to limit the size so as to permit the making of regular collections on schedule.

The collection equipment consists of the collecting wagons, horses, trucks and trailers, receiving stations, stables, railroad cars and miscellaneous minor equipment. The receiving station and stables are located near the geographical center of the city on Canal Road. The site comprises approximately one-third acre, on which the buildings are conveniently located as to railroad facilities on the Baltimore and Ohio Railroad, for shipment of garbage to the disposal plant. The property on which the buildings and loading platform are located, is leased for a short term, so that extensive improvements would not be warranted. The location is objectionable from the

A winter's collection of garbage and rubbish under the kitchen window.

Even the cat became used to it. This garbage has waited under the dining-room window for half the winter—for the collector

This collection of old food was the winter's decoration of a prominent corner in Cleveland's congested district.

Just at the back door. Barrel nearly buried by pile of food and rubbish.

standpoint of approach, due to the fact that it must be reached by steep grades by wagons arriving from all sections of the city, causing considerable trouble, especially in slippery weather.

Most of the buildings are the same as formerly used by the contractor. The buildings are of frame construction and in a rather dilapidated condition. The stable is of wooden construction, and in a poor state of repair. The size is not sufficient to accommodate the required number of horses, with a resulting crowding. The stables are poorly ventilated and lighted. One other stable is rented for service in the western part of the city.

The wagons are constructed with strong running gears, holding the steel tank body, having a capacity of 2½ cubic yards. The tank body is hinged to the rear axles and by means of a hoist the front end is elevated, discharging the material at the rear. The body is strengthened by arched ribs across the top, which supports a sectional canvas cover. In addition to the wagons, a number of trucks and trailers are used. The trailers are equipped so as to be drawn by either horses or tractors. The cars, sixteen in number, used for transportation of the garbage, are constructed entirely of steel and consist of a semi-cylindrical body supported upon trunnions. The cars have a capacity of 54 cubic yards or 35 to 40 tons.

The ordinances of the city require the provision by householders of suitable water-tight covered receptacles for garbage to be placed in accessible location for collectors. These ordinances are not enforced, especially among the poorer classes and in districts having foreign population, and in many cases boxes, buckets, baskets, etc., are used, which are not suitable receptacles.

The Municipal Reduction Plant situated at Willow is about two miles south of the southerly corporation limits and nine miles from the garbage loading station. It occupies a tract of land 50 acres in area and is situated in the Cuyahoga River Valley.

The buildings, comprising the present plant, consist of the Green Garbage Building, where the material is unloaded from the cars; the Main Building, which contains the digesters and dryers, to which is connected the building containing the grease-separating tanks and evaporators; the Percolating Building, containing the grease-extracting and separating machinery; and the Power House, containing boiler equipment and electric generating plant. The plant, as originally purchased from the contractor, was installed in 1898 and consisted of buildings of wood construction. The present buildings are constructed of brick and steel.

The plant, as remodeled by the city, was increased in capacity at the same time that improved equipment was installed for making recoveries of by-products. The old method of unloading the garbage from tanks by cranes was abandoned, and is now replaced by the Green Garbage Building, where the garbage from the cars is emptied by direct dumping. The cars enter the building on an elevated track and are dumped by means of chain hoists. The car bodies rotate on roller bearings, and the garbage is discharged on the concrete floor underneath the tracks. The garbage in the unloading building is shoveled upon scraper conveyors and discharged through chutes into the digesters, of which there are 33.

After digestion for a period of six hours, by using 70 to 80 pounds of steam, the steam pressure is applied at the top and the free liquor driven off through drains at the bottom to the settling basins, where the grease rises to the top and is skimmed off. The liquor from the bottom of the settling tanks is pumped to an evaporator for recovery of the solids in solution.

The tankage in the digester is removed through a side outlet and discharged into a conveyor leading to the driers. The driers are of two types. known as the rotary direct-heat drier, through which the material is passed. eliminating approximately half of the moisture contained in the tankage. It is then passed through a combination steam and air drier to remove the remaining moisture. After drying, the dried material is conveyed to the extractor building, where it is placed in percolators and the grease remaining is recovered by percolation, using gasoline as a solvent. The combined grease and gasoline are then pumped to stills where the solvent is evaporated, leaving the grease ready for storage. The gasoline, driven off from the stills, is condensed and returned to storage for further use. The tankage, after percolation, is returned to the driers where the stick or concentrated solids which were in solution coming from the evaporator, are mixed with the fibrous material, dried and then passed through the screening and grinding room before going to storage, awaiting sale of shipment.

It has been shown by figures, based on reports of New York garbage-reduction results, that one ton of garbage yields the following products: from the grease enough glycerine is obtained to furnish high explosives for ten French 75-millimeter shells, and soap stock sufficient to make 125 pounds of laundry soap; from the tankage or fertilizer enough plant food in the form of nitrogen, phosphate and potash is secured to raise ten bushels of wheat.

Many improvements have been made in the plant since it was originally purchased by the city, although very few changes have been made in the methods, or types of equipment used, during the past ten years.

As the city has grown, surrounding the plant, there has been increasing objection raised to the odors given off by the processes which originate from the vents on the digesters and from the gases from the driers. To eliminate the odor, special treatment must be given to the gases carrying odors, which will eliminate the nuisance. Attempts have been made from time to time to deodorize the gases. Plans are under way at present for the condensation of the gases or vapors given off by the digesters. The gases, which are of large volume, coming from the driers, are passed through a scrubber which consists of a horizontal brick chamber, where they are subjected to water sprays which wash and condense them. The efficiency of the scrubber is not sufficient to eliminate entirely the sweetish or caramel odor carried by these gases. It is realized by the city that steps are necessary to improve the present conditions at the plant, both from the standpoint of capacity and for the elimination of undesirable features and odors. The problem is under study at present.

The collection and disposal of dead animals were formerly handled by the city, but at present are done by private rendering companies, who remove and dispose of the large animals dying within the city. The small dead animals are disposed of with the garbage at the Reduction Plant. About 500 dead dogs are collected each month.

The following table gives the quantity of garbage collected and disposed of during the past ten years; also the cost of collection, cost of disposal, receipts from sale of by-products and the net cost for collection and disposal.

TABLE GIVING TONS OF GARBAGE HANDLED, COST OF COLLECTION, COST OF DISPOSAL, RECEIPTS FROM BY-PRODUCTS AND NET COST PER TON FOR COLLECTION AND DISPOSAL

Year	Tons Garbage	Cost Collection	Cost Disposal	Gross Income	Net Cost Collection, Disposal	Net Cost Per Ton
1910	44,747	$124,701	$101,936	$190,652.00	$ 35,985	$0.804
1911	46,562	139,456	110,094	189,894.00	59,656	1.281
1912	43,550	139,379	107,015	151,162.00	95,232	2.187
1913	52,354	143,672	113,057	157,705.00	99,024	1.891
1914	55,730	165,858	141,415	195,221.00	112,052	2.011
1915	62,357	181,556	151,503	224,691.00	108,368	1.738
1916	60,717	195,266	155,584	304,072.00	46,778	0.77
1917	56,121	236,035	191,001	292,745.00	134,291	2.393
1918	57,754	304,183	265,243	437,842.00	131,584	2.278
1919	60,932	355,175	238,202	296,361.00	297,016	4.874

ASHES AND RUBBISH

Previous to 1906 ashes and rubbish were collected entirely by private scavengers, who were not licensed and only in a general way under the supervision of the Division of Health. The collections were not regular, the city was incompletely covered and the service very inefficient. The material was disposed of by dumping on vacant lots, side streets and roadways, or in such places as it could be disposed of without causing immediate complaint. In 1906 the city undertook the collection of ashes and rubbish, in order to eliminate the nuisance caused by the littering of streets and alleys, also in order that the places of disposal could be controlled and more satisfactory results obtained.

The work, in connection with the collection and disposal of rubbish and ashes, is under the direction of the Commissioner of Streets, whose superintendents and assistants have charge of the work. The work of collection is carried on by the same organization that performs such work as is done in cleaning the streets, and men and teams used in collection are also employed at times in street cleaning.

For convenience the city is divided into six districts with a district superintendent in charge of collection service as well as street cleaning. Collection of ashes and rubbish is provided over the entire city. The frequency of collection varies and work is not regularly scheduled. In some sections there is a collection once in six weeks, in other sections more frequently. Collections are made by wagons or trucks. Additional trucks have been purchased for this service. The wagons are of the bottom dump type, having a capacity of four cubic yards.

Rules and regulations have been adopted by the Department to facilitate the work, which require householders to provide suitable receptacles and the tying of loose refuse into bundles. The rules have been difficult to enforce and in many cases are not complied with.

In order to eliminate the dumping of waste paper and at the same time to realize upon its commercial value, the Department collects waste paper separately. This is baled and sold. This applies to street boxes and some of the larger producers of waste paper, but as a rule, the waste paper from residences is collected at the same time as the ashes, and is disposed of by dumping.

The disposal of rubbish and ashes is made by dumping. The location of the dumps depends upon the land available for this purpose. In many cases dumps are made available by owners desiring their property filled. There are twelve principal dumping grounds now in use.

The lake front, near East 9th Street, is the largest dump. It was first begun by dumping directly into the lake, after which a breakwater was constructed. There have been made over one hundred acres of land from dumped material at this point. The principal filling has been with ashes, street cleaning dirt and material from cellar excavations.

At all the dumps the method is practically the same. The material is dropped from the wagons or trucks at the edge of the slope and then shoveled over the edge by hand. Considerable complaint is made of nuisance caused by the scattering of material, and the odors and smoke from fires in many of the dumps. These have generally been justified and their abatement is the duty of the Sanitary Bureau.

The following table gives the quantity of ashes and rubbish as collected during the past five years, together with the cost for labor and teams for the service, as reported by the Division of Streets:

Year	Cubic Yards Collected	Cost	Cost Per Cubic Yard
1915	318,390	$181,296.13	$0.57
1916	356,336	209,920.85	0.59
1917	335,769	227,249.03	0.677
1918	477,967	277,650.03	0.58
1919	495,834	284,286.26	0.5734

The above cost includes only expenditures for teams and labor, and not any fixed charges, maintenance, overhead or allowance for use of trucks owned by the city.

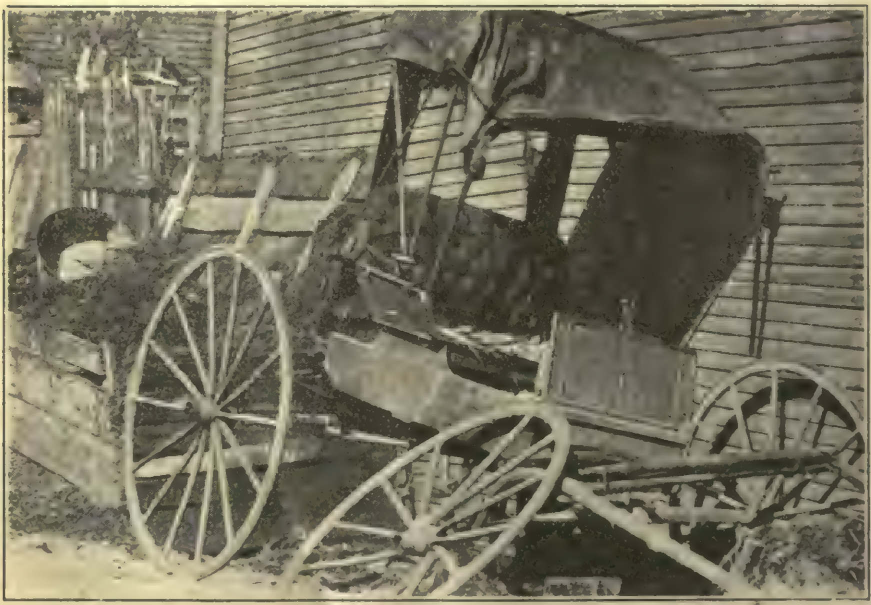
The Director of Public Service is now having a complete study and survey made in order to determine what steps should be taken to remedy and improve the conditions of collection and disposal of garbage, ashes and rubbish. This survey and study considers what steps can be taken to improve the collection service and at the same time reduce the cost for long hauls and the present expensive methods of handling.

The investigation and report will cover the various methods necessary for collection, delivery and disposal of ashes, rubbish and garbage, including substantially the following subjects:

1. Analysis of data contained in the records of the Department of Public Service with reference to collection of garbage, ashes and rubbish.
2. Study of population and future growth of the city to provide for a comprehensive plan for future needs.
3. Comparison of various methods of collection and types of equipment suitable to systematize that service for the City of Cleveland.
4. Comparison of various methods of disposal for different classes of waste, adaptable to Cleveland's needs.
5. Outline of essential features necessary to produce a sanitary and economical collection and disposal of garbage, ashes and rubbish by various methods.
6. Quantities and plant capacities with proper allowance for future growth and local conditions.
7. The advisability of collection and disposal of waste in a central plant as compared with a number of plants.
8. Determination of and advisability of a number of transfer stations and methods of transfer and delivery of material to points of disposal.
9. Comparison of costs by various methods of collection and disposal, giving capital cost, annual operating and maintenance charges, also the total plant charges and revenues.
10. Recommendations. A discussion of the various projects adaptable to Cleveland, with recommendations covering the most feasible plan for the collection and disposal of waste from a sanitary and economical standpoint.

The complete study, as outlined above, will take into account all practicable plans that might be adopted, each developed so that the most feasible plan can be recommended, taking into account the sanitary and economical advantages to be gained to take care not only of present conditions but the future needs of the city.

A "Front Door" on a Cleveland Alley. The pile is made up of mixed garbage and rubbish.



Stable refuse on an alley in Cleveland's most congested quarter In the Spring a natural breeding place for millions of flies.

Food and rubbish. The winter collection of a Cleveland backyard.

Next door to a grocery store in Cleveland's congested district.

STREET CLEANING

The work of cleaning the streets is under the direction of the Street Commissioner and directly under one of the deputy commissioners. The work is carried on by district gangs, who are in charge of the collection and disposal of ashes and rubbish. Men and teams interchange for each class of work.

The city is divided into six districts for refuse collection, with a foreman in charge of each district. The city is divided into three districts for street cleaning, by a "white wing" patrol, with a foreman of "white wings."

The catch basin cleaning under the direction of a foreman, includes the whole city, except for parks and boulevards, which are under another department.

There is also a foreman in charge of equipment, including wagons, trucks and automobiles. In addition, there is the office force and a corps of inspectors and investigators of complaints. To each foreman is assigned such assistants, subforemen, laborers and teams as required.

There are 609 miles of paved streets in the city, and the methods of cleaning consist principally of "white wing" patrol, pickups and flushing. The cleaning of streets in the downtown section and the streets at more important intersections is done principally by "white wings."

The patrol districts are not established, and the number of "white wings" employed varies with the funds available for cleaning work, with the result that the thoroughness of cleaning varies. No record is kept of the areas cleaned daily or left uncleaned, and the records are made up by assuming that each "white wing" has cleaned his allotted area at least once a day, irrespective of the work actually accomplished. The work is reported for "great squares," which contain 10,000 square feet each.

The following table gives the work of the "white wing" patrol and the cost of it for the past five years, as given in reports of the Division of Streets.

Year	Squares Cleaned	Total Cost	Average Cost Per Square
1915	438,606	$119,421.15	$.2723
1916	448,387	104,327.78	0.2326
1917	300,083	135,389.83	0.4512
1918	312,094	105,358.34	0.3375
1919	313,497	139,055.72	0.4435

The above cost covers only labor and teaming, and does not include any fixed charges, maintenance or overhead.

The method of pickups, in addition to flushing, is used on streets not included in the "white wing" areas. The men and equipment used in ash and rubbish collection are used largely in pickup work, which consists principally in cleaning gutters and picking up the accumulation of dirt on the streets. This method is used largely in outlying and residential streets.

The following table gives the work by the pickup method as reported for the past five years, including the labor and teaming cost for the work.

Year	Squares Cleaned	Cost	Per Square Average
1915	93,993	$59,544.78	$0.74
1916	112,091	75,073.04	0.67
1917	75,342	78,497.82	1.04
1918	84,653	69,563.54	0.82
1919	85,624	75,967.96	0.89

One of the principal methods of cleaning is by flushing the streets, which is employed occasionally in the warm months of the year, on the main thoroughfares. The city has two motor driven flushers employed in this work and eleven street car flushers, rented from the street railway company.

The motor driven flushers are used in the city as a whole, and assigned for work as needed. The street car flushers, when used, are operated on streets having trackage.

Aside from the cleaning done by "white wing" patrols, the most effective work is done by flushing, although this is not extended so as to cover territory outside the main thoroughfares.

The following table gives the work and costs for flushing during the past five years.

Year	Squares Flushed	Cost	Average Cost Per Square
1915	329,319	$36,351.93	$0.11
1916	310,384	34,971.99	0.113
1917	163,168	20,250.47	0.124
1918	247,306	13,966.63	0.056
1919	336,340	18,165.68	0.054

During 1919 there was reported flushed by street car flushers 251,097 squares at a cost of $12,676.25, or an average cost of $0.0505 per square; and by motor flushers 85,243 at a cost of $5,489.43, or an average of $0.0644 per square.

The above costs include the rental paid the Street Railway Company but do not include any fixed charges, maintenance, overhead or cost for water, which, if added to the total, would increase considerably the cost for motor flushers.

The following table gives the direct expenses during the year 1919 for labor and team hire in the Street Cleaning Division, but not including fixed charges or replacements:

EXPENDITURES OF THE DIVISION OF STREET CLEANING DURING THE YEAR 1919

Household refuse collection	$284,286.26
White wing patrol	139,055.72
Pickup gangs	75,967.96
Supervision and inspection	58,734.08
Catch basin cleaning	39,994.38
Maintaining dumps	29,486.93
Mechanical repairs	27,233.90
Watchman	25,695.40
Market cleaning	15,786.56
Street car flushing	12,676.25
Waste paper	10,508.70
Motor flushing	5,489.43
Snow removal	2,599.99
Cinders	799.03
Total	$728,314.59
Labor payroll	526,650.49
Team payroll	192,998.85
Rent of car flushers	8,665.25
	$728,314.59

The insignificant sum charged to cost of snow removal in 1919 may be the explanation, it cannot be offered as the excuse for the intolerable filth and neglect of the streets during the winter of 1919-20.

GENERAL

The studies, now being made for the Director of Public Service, of the the city services for street cleaning and the collection of ashes, rubbish and garbage, will show where improvements can be made.

One of the chief handicaps of the city has been the limited funds available for conducting the work, with continually increasing cost for labor and equipment.

If systematic and efficient work is to be carried on, the following requisites are necessary for success:

1. A sufficient appropriation.
2. An efficient organization.
3. Sanitary and economical methods of work.
4. Cooperation on the part of the public.

Appropriation is necessary to cover the cost of the work to be done, and the quantity of work accomplished will depend on the fund available, providing it is efficiently used. An efficient organization will develop effective and economical methods of work. Sanitary and economical methods of work will be obtained from study and application of studies, after comparison of records and unit costs of the work by various methods.

The cooperation of the public can be obtained by education and regulations consistently and uniformly enforced. Results will be more readily obtained when efficient and satisfactory service has been rendered. All four requisites are dependent on each other to obtain the maximum degree of success.

From the investigation made it is evident that very little intensive study has ever been given the street cleaning work in the city.

A comparison of the work done in Cleveland with that of other cities will show that less work is given here to effective street cleaning than in the other cities of comparable size; at the same time, the annual expenditure for the work is less than in other cities. The result is that many streets are seldom cleaned thoroughly, and many receive only such work as is given by the pickup method in cleaning gutters a very few times per year, a wholly inadequate service.

From the studies made it has developed that the records of the Street Cleaning Department are not complete as to the actual work performed, and unit costs for conducting the different parts of the work have never been developed. These are essential to permit the official in charge to obtain the information necessary for the proper work control and administration.

The Director of Public Service is now planning for necessary changes in organization to provide assistants in the Street Cleaning Department. There will be systematic planning of work and a system for record and unit cost keeping of the several activities of the Department. These, when installed, should greatly assist in the direction of the Department.

In one city, where studies were made, it was found that out of an annual expenditure of $350,000 at least one-third of the amount was wasted, due to inefficient work and inefficient methods.

The city of Washington, by adoption of methods in planning and establishment of complete record and unit cost keeping, was able to reduce the cost of street cleaning 30 per cent, and at the same time to do more effective work. Washington, during the summer months, washes each street on an average of once for each two and a half days. New York City has established methods and standardized the street cleaning work so that every important or congested thoroughfare is cleaned by flushing, by squeegee machine, or by sprinkling and sweeping, at least once in every 24 hours.

With the shortage of funds for municipal work in Cleveland the establishment of the methods proposed should assist the officials in charge to accomplish the greatest amount of work with the funds available.

It is recommended that:

The steps being taken by the city in having studies made to determine improvements

necessary for the collection and disposal of garbage, ashes and rubbish be approved. They should permit the adoption of improved methods equal to those found in any city.

Special attention be given in studies now being made to eliminate so far as possible cause for complaint of nuisance, due to odors from dumps or disposal plants, either by more attention to control of dumps or by the adoption of other means for disposal.

It is essential, in order to control properly and carry on efficiently the work of street cleaning to plan, schedule and keep records and unit costs of the work. The step being taken by the Director of Public Service to provide for an assistant to the Commissioner, who will develop, install, and keep records and unit costs of the several activities of the Department will be one of the most progressive steps taken since the organization of the Department. The work done should include studies of the work actually performed, to determine the advantages to be gained by making changes and improvements, and should furnish the Director and Commissioner with detailed information necessary for the work, the control and the management of the Department.

The Collection of ashes and rubbish should be scheduled so that regular and systematic collections are made. Thus residents can plan on the time when collections will be made and have materials in proper condition for the collector. This will permit a better enforcement of regulations and will eliminate complaints.

Flies and Mosquitoes

THERE is no directory or list of stables and no census of horses or cattle stabled in Cleveland, kept at the Division of Health or otherwise available. There are no regulations enforced dealing with the collection and disposal of animal manure so as to control fly breeding in Cleveland. Manure piles, fresh and of long standing, were found commonly in the residential regions in the poorer quarters of town within common fly range of unscreened food stores and restaurants. Only one of several score of privies inspected on both West and East Sides of the city in the regions supplied or not supplied with sewers, was found to be so constructed as to give any reasonable expectation that flies could be kept away from access to freshly deposited human waste or to the privy vault itself.

Only one privy above noted was found with seat covers, or if seat covers were provided, they were so made and used as to be of no use in excluding flies from the vault. Doors were open or cracked. Windows in privy closets not screened, fecal deposits on the seat, on the floor and overflowing from the pit on the ground without, were frequently found. Uncovered garbage cans and uncollected accumulations of garbage are common even in warm weather.

Under these conditions for which the Sanitary Bureau of the Division of Health must be held responsible, it is unnecessary to go into any detail as to the fly nuisance in Cleveland. "Swat-the-fly" campaigns, or efforts to teach children and householders to kill flies and reduce disease are mere waste of time. Until breeding places of flies, that is, exposed fresh animal excreta are controlled attacks upon the fly upon the wing are vain. Screening is necessary, and except in cheap eating and food stores, which seem to escape inspection, is fairly well accomplished. Control of water and milk and education of mothers are responsible for the low incidence of enteric disease in Cleveland, and not control of the fly.

Neither mosquitoes nor malaria are sufficiently common to require any special attention. Mosquitoes breed more or less according to the character of the breeding season, but do not amount to a serious nuisance within the city limits. Only twelve cases of malaria were reported to the Division of Health in the years 1916-19 inclusive.

RECOMMENDATIONS

It is recommended that:

The Sanitary Bureau maintain supervision over the horse and cow stables in Cleveland and with such authority as can be found in the Sanitary Code, require the protection and periodic removal of manure so that fly breeding may be reduced or largely prevented.

All privies in Cleveland be so constructed and maintained after well-known methods as to prevent access of flies to human excreta.

The holding of garbage in covered tight metal containers and the removal of garbage at least twice a week from April to November be required throughout the city.

An ordinance be passed and enforced forbidding such collections of water as are likely to permit the breeding of mosquitoes. (For model ordinance see U. S. Public Health Reports, 1920, April 2, page 829.)

Smoke and Its Prevention

ONE might honestly report after a careful survey of the city and its public and private agencies, that nothing of a practical nature is being done or even attempted in the field of smoke prevention. Cleveland enjoys an amazingly, and one would be tempted to say, an intolerably polluted air all the year round. The reason is not that such air pollution as Cleveland tolerates cannot be abated, or that similar disgraceful interference with health and the enjoyment of life has not been controlled elsewhere.

> "There is nothing impossible or wonderful about the smokeless combustion of even Pittsburgh coal, provided the proper methods are applied and the ordinary precautions taken."

Such was the opinion expressed by the competent group of engineers responsible for Bulletin 8 of the Smoke Investigation of Pittsburgh in 1914.

Another statement in the same publication is so directly applicable to Cleveland that it will bear quoting:

> "A small group of men control the plants which produce 80% of the smoke of the district. The solution of Pittsburgh's smoke problem lies in inducing these men to apply the best modern engineering practice to the combustion of fuel in their plants."

If the Chamber of Commerce of Cleveland could convince the manufacturing and commercial interests of the city that their indifference to the smoke nuisance is responsible for a very large amount of sickness in the city, and that the antiquated equipment and careless administration of their plants which cause this nuisance, cause them and the city each year a cash loss of several times the amount of the total annual Community Fund, or at a modest estimate about $20,000,000, action, civic and individual, would probably follow with gratifying rapidity.

It needs no visiting surveyor to tell the people of Cleveland what their senses, sight, touch, smell and taste must convince them of daily, that the air of their city is unfit for human consumption just as their sewage-polluted water was a few years ago.

Since no quantitative observations of air pollution in Cleveland could be discovered, a brief series of soot-fall studies was made during July and August, the months of the year when the degree of air pollution from soot is probably at its lowest. As compared with certain English cities and with Pittsburgh (Bulletin 8, Smoke Investigation, page 22) probably Cleveland's nearest former competitor in smoke production, in this country, Cleveland now deposits a few tons per square mile per annum less of combustion products than did the other cities (London and Pittsburgh) when they were at the height of their nuisance. In recent years both the English cities and Pittsburgh have made improvements in this direction. Cleveland is supine in the face of increasing air pollution.

The following statement represents reports received from the firm of consulting engineers (The James H. Herron Co.) engaged to make soot-fall studies for the Survey.

PURPOSE OF EXAMINATION

The purpose of the examination was to determine the amount of matter present in the atmosphere in samples taken from a number of stations throughout the city of Cleveland, also to get data which, if possible, may be compared with the work done in other communities on this same subject.

EXTENT OF EXAMINATION

Observations were made at four stations situated as follows:

1. The roof of the Superior Peanut Co. building, situated adjacent to the Huron Road Hospital. This place was chosen owing to the fact that a roof position on the hospital was not available.
2. The roof of St. Alexis Hospital, Broadway and McBride Avenue.
3. The roof of the Babies' Dispensary, 2500 East 35th Street.
4. The roof of Mt. Sinai Hospital, 1800 East 105th Street.

It was decided that the samples collected from these locations would be sufficiently representative for general comparative purposes.

APPARATUS USED

The apparatus used was composed of a gauge of four square feet in area and was similar to the standard gauge used in the investigation of atmospheric pollution in the city of London in the years of 1914 and 1915. This gauge was deemed most satisfactory for this purpose.

THE ANALYSES

The deposit was collected at the end of each month and the analyses as reported made at the end of each of the two months, June 26 to July 26 and July 26 to August 26. The deposit was analyzed for tar, ash, fixed carbon and iron oxide. This followed the order in which the analyses were made in connection with the smoke investigation of the city of Pittsburgh, the result of which was published in Bulletin No. 8 of Smoke Investigation. The results given in this analysis are comparable with the results obtained in Pittsburgh.

OBSERVATIONS, JUNE 26 TO JULY 26, 1920

	At Huron Road Hospital	At Babies' Dispensary and Hospital	At St. Alexis Hospital	At Mt. Sina Hospital

Soot Fall per Square Foot per Month

	1.4940 Grams	1.5530 Grams	1.6514 Grams	.9436 Grams

Per Cent Composition of Deposit

Tar	2.82	2.29	.55	2.86
Fixed Carbon	32.65	31.26	34.19	31.80
Ash	64.55	66.45	65.26	65.34
Fe_2O_3 in Deposit	6.67	11.04	10.82	15.75

Deposit in Tons Per Square Mile Per Year

Total Deposit	550.94	592.70	608.98	347.97
Tar	13.55	13.58	3.34	9.95
Fixed Carbon	178.59	185.40	208.24	110.66
Ash	355.80	393.72	397.40	227.36
Fe_2O_3 in Deposit	36.75	65.45	65.70	64.80

OBSERVATIONS, JULY 26 TO AUGUST 26, 1920

	At Huron Road Hospital	At Babies' Dispensary and Hospital	At St. Alexis Hospital	At Mt. Sina Hospital

Soot Fall per Square Foot per Month

	3.7775 Grams	2.7259 Grams	1.9995 Grams	.8421 Grams

Per Cent Composition of Deposit (July 26 to August 26 1920)

Tar	3.33	3.61	3.76	4.43
Fixed Carbon	28.94	32.15	33.33	32.40
Ash	67.73	64.24	62.91	63.17
Fe_2O_3 in Deposit	23.00	17.90	13.38	16.58

Deposit in Tons per Square Mile per Year

Total Deposit	1392.91	1005.15	737.31	310.52
Tar	46.39	36.32	27.66	13.75
Fixed Carbon	403.11	323.15	245.74	100.61
Ash	943.41	645.68	463.91	196.16
Fe_2O_3 in Deposit	320.37	179.92	98.65	51.48

Average Deposit in Tons per Square Mile per Year Calculated on Observations June 26 to August 26, 1920

Total Deposit	971.73	798.93	673.15	329.50
Tar	29.97	24.95	27.50	11.85
Fixed Carbon	290.85	254.28	226.99	105.63
Ash	649.61	519.70	430.65	211.76
Fe_2O_3 in Deposit	178.56	122.58	82.18	58.14

At times in the past in both Pittsburgh, Pennsylvania and London, England, deposits of more than 1,000 tons per square mile per year have been recorded for periods of a month or more. For details of relative proportions of the solid components of the deposits in Cleveland and in other cities here and abroad the reader is referred to original documents.

There is a not inconsiderable volume of air pollution due to volatile substances, the sulphurous acid and other fumes commonly found accompanying heavy soot fall, but precise information as to the extent of such harmful substances must await studies of greater extent than the Survey could undertake in the time and with the money at its disposal.

Admitting, if only for the sake of argument, that Cleveland suffers from an extreme case of dirty air, and certainly the valuable reports of the Cleveland Chamber of Commerce in recent years should leave one in no doubt as to the extent of financial loss to persons and property justly attributable to this public nuisance, it may reasonably be asked what is the interest of the Hospital and Health Survey in air pollution.

Briefly, diseases of the upper respiratory tract are increased by the irritation of coal dust in the air, and pneumonia is to some degree increased in frequency and severity by pollution of the air with coal dust. Diminution of sunlight reduces the bactericidal action of this most sanitary free agent. A diminution of sunshine which is familiar to every Clevelander for all the cool and winter months of the year, can be shown to permit an increase of bacteria, both pathogenic and harmless, in the air. "When the air is dirty it is hard to get the streets, the yards, the clothes, the people clean," and certainly bodily, personal and home cleanliness are important safeguards to health. The baleful psychical effect of smoky, dark and dirty air on human health and happiness has been emphasized by observers in England and in Pittsburgh.

In an ever wider radius from the main centers of smoke production, plant life, tree life and especially the life of evergreen trees and shrubs is being destroyed. The constant deposit on the ground of coal, tar, ash, cinder and unburned carbon destroys the scant fertility of grass plots in yards and parks in many parts of the city. It must be admitted that where the air contains such pollution as to make life unbearable for vegetation, we must look sharply to protect the lives and health of the human flowers, the children who for large numbers of the population, have no escape from the soot-laden air.

True, there is a Commissioner of Smoke Prevention appointed by the Mayor. He has an office in the City Hall. He receives a salary of $2,000.00 a year. His preparation and education for this highly technical position has been that of a fireman on a locomotive. He has had no technical training, he has no books or laboratory or instruments of precision, or experience in the practices used elsewhere to measure the extent of smoke nuisance, to prepare strong cases and arguments in court, or to carry on effective education among plant owners, engineers, firemen, etc. One of his functions is to pass upon and issue licenses for plants for heating, power and other coal and oil consuming furnaces, all of which he does as a part of a purely formal clerical routine, without inquiry as to the adequacy of draft or other equipment, such as mechanical stokers, etc., which will render smoke nuisance at least less likely. There are four inspectors also appointed by the Mayor, and not through civil service examination, receiving $1,375.00 a year and a stenographer at $900. In the same office at a desk adjacent to that of the Commissioner of Smoke Prevention is an employe of eight of the railroads operating within the city limits. He receives $3,900.00 a year. His experience was formerly locomotive fireman and later foreman responsible for locomotive equipment on one of the important railway systems. His function is to serve the railroads which pay him, so that observations made by the field inspectors (or by himself) of wasteful smoke nuisance from locomotives may be promptly reported to the company concerned, and the offending fireman may be reprimanded, suspended or dismissed. As a matter of fact, the saving to the railroads in fuel cost, as the result of disciplinary action directed against careless firemen, more than offset the expense of their smoke inspection service. There is probably some benefit to the city from this servant of railroad operating efficiency, but locomotive smoke plays but a small part in the general curtain of dirt which the plant chimneys throw over the city.

Of the four inspectors in city employ, one is assigned to the east, one to the west, one to the downtown section of the city and one is on railroad duty to assist the railroad employe above referred to. Reports of smoke nuisance are based on duration and density as measured by the Ringleman chart. No action follows violation of the city ordinance. The reasons given for failure to prosecute (there have been no prosecutions for many months) are that there is not only no public opinion in support of vigorous action but that there is active opposition to any interference with industry in the interest of clean air, and further that cases are continued in the Municipal Court until all value of action is lost and there is lacking reasonable, judicial support for the objectives of the city officials.

Conditions of smoke nuisance are reported by responsible observers both in and out of the city employ to be much worse than they were under the administration of Mayor Baker, when the Commissioner of Smoke Prevention, a trained civil engineer at a salary of $4,000.00, and with a force of competent inspectors, made an intelligent and effective attack on the problem. The resentment and opposition of prominent men against whose plants action was taken, resulted in the discontinuance of an efficient service by cutting off the appropriation.

A complication which adds somewhat to the problem of the plant manager and engineer is that under the laws of Ohio a fireman must be licensed to run a fire room, and this operates largely to make him independent of the engineer in charge, so that criticism or complaint of the firing which is always in large measure the fault responsible for smoke nuisance, is withheld for fear of loss of the fireman in question.

At present the returns from the city expenditure ($8,400.00 annually in salaries) for smoke abatement are negligible.

RECOMMENDATIONS

It is recommended that:

A competent engineer familiar with the technical phases of cause and prevention of smoke nuisance, and with the harmful results to property and life from such other kinds of air pollution from combustion, refining, smelting and other industrial processes as are common in Cleveland, be employed as Commissioner of Smoke Prevention, and be paid a salary commensurate with his responsibility (not less than $6,000), and that he be provided with a budget which will permit him to employ through civil service competent inspectors (four would be sufficient).

The Chamber of Commerce resume its activities in the public interest by developing among its members an intelligent activity for cleanliness of the air of Cleveland, by aiding and encouraging prosecution of violators, by publishing technical bulletins giving modern standard methods of mechanical stoking and hand firing, by serving its own members through an inspection service which will prevent any of its members from coming under criticism by the city inspectors.

The Cleveland Betterment Council take an active part in obtaining proof of the damage done by air pollution to the health of people of the city, through regional studies of soot fall, etc., and by analysis of the distribution of sickness and death, in cooperation with the Division of Health and the public nursing agencies.

THE CLEVELAND HOSPITAL AND HEALTH SURVEY REPORT

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